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COVID-19 and Digital Contact Tracing: Regulating the Future of Public Health Surveillance

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COVID-19 AND DIGITAL CONTACT TRACING: REGULATING THE FUTURE OF PUBLIC HEALTH SURVEILLANCE

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Digital surveillance tools—technological means of monitoring, tracking, and notifying—are at the forefront of public health response strategies for the COVID-

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19 pandemic. Comprehensive and effective digital public health surveillance requires that public health authorities, regulatory powers, and developers consider interdisciplinary approaches. This entails accounting for the use of proximity data and Bluetooth technology; notification systems from technology companies; and laws and regulations associated with health information, biometric privacy, and mobile data. Of particular importance is incorporation of epidemiological considerations in development and implementation of digital tools, including usability across mobile devices, interoperability, regulation of literacy and disability compatibility, and incentivization for adoption. It is both feasible and prudent that the United States establish a federal network for public health surveillance aided by digital tools, especially considering that waves of COVID-19 are expected to continue well into 2021 and while the threat of other emerging infectious diseases persists.

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INTRODUCTION

Given the scale of the coronavirus disease 2019 (COVID-19) pandemic, dependence on traditional contact tracing[1] alone may prove insufficient for countries to effectively and efficiently track and trace the spread of the severe acute respiratory coronavirus 2 (SARS-CoV-2).[2] With continued reliance on digital connectivity for numerous aspects of our lives, digital surveillance tools provide a potential opportunity to supplement existing contact tracing initiatives by facilitating the fast identification of known and unknown contacts.[3] Pressure is mounting to develop epidemiologically-useful digital tools, as states across the United States continue lifting stay-at-home orders and attempt to return to normal operations.[4] Over twenty states are currently considering, designing, or implementing digital contact tracing tools.[5] The accelerated development and launch of these tools

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1 CTRS. FOR DISEASE CONTROL & PREVENTION, CASE INVESTIGATION AND CONTACT TRACING: PART OF A MULTIPRONGED APPROACH TO FIGHT THE COVID-19 PANDEMIC (2020), https://www.cdc.gov/coronavirus/2019-ncov/downloads/php/principles-contact-tracing-booklet.pdf [https://perma.cc/364U-S9KX] [hereinafter CDC, CASE INVESTIGATION AND CONTACT TRACING]; *see also* Lawrence O. Gostin & James G. Hodge, Jr., *Piercing the Veil of Secrecy in HIV/AIDS and Other Sexually Transmitted Diseases: Theories of Privacy and Disclosure in Partner Notification*, 5 DUKE J. GENDER L. & POL'Y 9, 14, 16 (1998) (noting that traditional methods involved humans in the field conducting voluntary interviews with infected persons to determine their relevant location histories and other persons who may have been in their vicinity).

2 Luca Ferretti et al., *Quantifying SARS-CoV-2 Transmission Suggests Epidemic Control with Digital Contact Tracing*, 368 SCIENCE 619 (2020).

3 *See generally* EUROPEAN CTR. FOR DISEASE PREVENTION & CONTROL, MOBILE APPLICATIONS IN SUPPORT OF CONTACT TRACING FOR COVID-19: A GUIDANCE FOR EU/EEA MEMBER STATES (2020), https://www.ecdc.europa.eu/en/publications-data/covid-19-mobile-applications-support-contact-tracing [https://perma.cc/URB7-2VPV] [hereinafter ECDC, MOBILE APPLICATIONS].

4 *Digital Contact Tracing Can Slow or Even Stop Coronavirus Transmission and Ease Us Out of Lockdown*, BIG DATA INST. (Apr. 16, 2020), https://www.bdi.ox.ac.uk/news/digital-contact-tracing-can-slow-or-even-stop-coronavirus-transmission-and-ease-us-out-of-lockdown [https://perma.cc/85MC-8TDJ] [hereinafter *Digital Contact Tracing*].

5 Dave Burke, *An Update on Exposure Notifications*, GOOGLE: KEYWORD (July 31, 2020), https://blog.google/inside-google/company-announcements/update-exposure-notifications/amp [https://perma.cc/2TT2-3KSW].

demand that we consider the interests of privacy, efficiency, and effectiveness in shaping the future of digital surveillance for emerging infectious disease threats and other existing public health issues.[6]

This Article discusses important aspects for the development and implementation of digital contact tracing tools, the demand for robust data stewardship, and the need for the U.S. federal government to create a regulatory framework for governing these tools and any future surveillance technologies for public health. Of importance are: (1) the overall development and regulation of digital surveillance tools within the context of epidemiology;[7] (2) requirements related to protected health and medical information;[8] (3) the formulation of a federal contact tracing program compared to state-level solutions;[9] and (4) security and privacy concerns about cellphone tracking data.[10] However, considerations need to be made regarding: (1) important factors for user interfaces to promote adoption of the tools;[11] and (2) alternative solutions to contact tracing apps that may be better options for nationwide, and even global, public health surveillance.[12] It would be feasible for the U.S. government to establish a national network for contact tracing, and considering that waves of COVID-19 are expected to continue well into 2021, the time to take a proactive stance is now.

I. DEVELOPING DIGITAL SURVEILLANCE TOOLS

Contact tracing is a well-established method of tracking and tracing the spread of a virus to slow, and potentially stop, virus transmission during outbreaks.[13] Typically, case investigators conduct

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6 *Privacy in the Age of COVID: IDAC Gets Results from COVID-19 Apps Report*, INT'L DIGIT. ACCOUNTABILITY COUNCIL, https://digitalwatchdog.org/privacy-in-the-age-of-covid-idac-gets-results-from-covid-19-apps-report [https://perma.cc/7KV4-3ZNE] [hereinafter IDAC]; *see also* Maimuna S. Majumder & Angel N. Desai, *How Contact Tracing Apps Could Help Prevent COVID-19 Super-Spreader Events*, ISSUES SCI. & TECH. (Oct. 29, 2020), https://issues.org/how-contact-tracing-apps-covid-19-super-spreaders-majumder-desai [https://perma.cc/D8C5-XUSD].

7 *See infra* Part I.

8 *See infra* Part II.

9 *See infra* Part III.

10 *See infra* Part IV.

11 *See infra* Part V.

12 *See infra* Part VI.

13 Gostin & Hodge, *supra* note 1.

interviews with positively diagnosed individuals to establish their movements and interactions in order to identify, notify, and interview others possibly infected.[14] However, traditional techniques are limited in the context of the COVID-19 pandemic and its scale, particularly given the possibility of transmission between strangers and asymptomatic carriers.[15]

Additionally, a trust deficit exists that reduces the willingness of many individuals to provide information about their whereabouts and interactions to government entities[16]—exacerbated by virally syndicated misinformation.[17] The design and implementation of digital contact tracing tools, and exposure notification[18] tools, should be grounded in the principle of proportionality,[19] establishing data

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14 CDC, CASE INVESTIGATION AND CONTACT TRACING, *supra* note 1.

15 W. Joost Wiersinga et al., *Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-19): A Review*, 324 JAMA 782 (2020); *see also Interim Clinical Guidance for Management of Patients with Confirmed Coronavirus Disease (COVID-19)*, CTRS. FOR DISEASE CONTROL & PREVENTION (Dec. 8, 2020) , https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html [https://perma.cc/4KHW-ZGFU].

16 HARSHA PANDURANGA, LAURA HECHT-FELELLA & RAYA KOREH, GOVERNMENT ACCESS TO MOBILE PHONE DATA FOR CONTACT TRACING: A STATUTORY PRIMER (2020), https://www.brennancenter.org/sites/default/files/2020-05/2020_05_21_ContactTracingPrimer_Final.pdf [https://perma.cc/6WW7-NVHM]. It is essential to note that the trust deficit stems from how contact tracing is handled rather than being inherent in the disease. *See also* Alice Miranda Ollstein & Darius Tahir, *Contact Tracing Foiled by Conspiracy Theories, Lack of Federal Messaging*, POLITICO (Sept. 3, 2020, 7:55 PM), https://www.politico.com/news/2020/09/03/contact-tracing-conspiracy-theories-trump-messaging-408611 [https://perma.cc/6HF3-6YPP] (noting that President Trump's lawyer, Rudy Giuliani, has "mocked contact tracing, while several state and local GOP officials and candidates have boasted about refusing to provide information after testing positive and called the practice 'communist'").

17 *See generally* ZOIS BOUKOUVALAS ET AL., INDEPENDENT COMPONENT ANALYSIS FOR TRUSTWORTHY CYBERSPACE DURING HIGH IMPACT EVENTS: AN APPLICATION TO COVID-19 (2020), https://arxiv.org/pdf/2006.01284.pdf [https://perma.cc/4EG9-FJEU].

18 There are important distinctions between contact tracing and exposure notification apps. In comparison to contact tracing apps, where people log information that is then shared with public health authorities, exposure notification apps notify a user if they have been in a nearby proximity to someone who later tests positive for SARS-CoV-2. Importantly, exposure notification apps would not tell when or where a user was potentially exposed to the virus. From an epidemiological perspective, contact tracing is more beneficial in that it helps epidemiologists and public health officials trace and map spreads of outbreaks based on location data.

19 "Proportionality" is closely related to justifiability. To determine the justifiability of a privacy-invasive measure, it is important to weigh the risks of intervening against anticipated public health benefits, as well as the risks associated with not intervening. Whether a contact tracing app is "proportionate" depends on the actual or potential consequences of opting-in to the system. This may vary depending on whether other functionalities are bundled into the app (*e.g.*, quarantine enforcement), what information is collected, how long it is stored for, what it is used for, and who has access to it (*e.g.*, law or immigration enforcement).

collection and processing at a scale that is: (1) proportional to the severity of the public-health threat; (2) limited to what is minimally necessary for achieving specific public-health objectives; and (3) scientifically justified.[20] And notably, the recent partnership between Google and Apple is driving the design of contact tracing and exposure notification apps and other digital notification systems.

A. *The Significance of the Google & Apple Partnership*

Google and Apple partnered to provide a novel contact tracing application programming interface (API).[21] The Google-Apple Exposure Notification (GAEN) API is inspired by the European consortium Decentralized Privacy-Preserving Proximity Tracing protocol (DP-3T) for exposure notification, and enables expanded access to Bluetooth scanning for apps using the API, improving the ability for signal detection between Android and Apple devices.[22] The API also smooths operating functions and spares battery life but only for official public health authority (PHA) apps that adopt a decentralized design and abide by their Terms of Service (Terms).[23]

These Terms stipulate that the collection of location data is prohibited, data must be used only for COVID-19 response efforts, and developers must follow their retention limitation and non-

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20 Marcello Ienca & Effy Vayena, *On the Responsible Use of Digital Data to Tackle the COVID-19 Pandemic*, 26 NATURE MED. 463, 463 (2020); *see also* WORLD HEALTH ORG., ETHICAL CONSIDERATIONS TO GUIDE THE USE OF DIGITAL PROXIMITY TRACKING TECHNOLOGIES FOR COVID-19 CONTACT TRACING 3 (2020), https://www.who.int/publications/i/item/WHO-2019-nCoV-Ethics_Contact_tracing_apps-2020.1 [https://perma.cc/8HL9-UU8T]; WILLIAM J. BUTLER, AM. ASS'N FOR THE INT'L COMM'N OF JURISTS, *Introduction to* SIRACUSA PRINCIPLES ON THE LIMITATION AND DEROGATION PROVISIONS IN THE INTERNATIONAL COVENANT ON CIVIL AND POLITICAL RIGHTS 3, 3–4 (1985), https://www.icj.org/wp-content/uploads/1984/07/Siracusa-principles-ICCPR-legal-submission-1985-eng.pdf [https://perma.cc/KFS4-AM2S].

21 APIs provide a technical method for apps to retrieve, process, and share device information. *See Exposure Notifications: Using Technology to Help Public Health Authorities Fight COVID-19*, GOOGLE , https://www.google.com/covid19/exposurenotifications [https://perma.cc/F47X-F3WV] [hereinafter GOOGLE, *Exposure Notifications Terms*].

22 *See generally* CARMELA TRONCOSO ET AL., DECENTRALIZED PRIVACY-PRESERVING PROXIMITY TRACING 20, 30–35 (2020), https://arxiv.org/pdf/2005.12273.pdf [https://perma.cc/ZZN3-RASL] (noting that the GAEN API allows devices to send, receive, and keep track of a random set of rotating Bluetooth identifiers broadcast by other users of the app).

23 GOOGLE, *Exposure Notifications Terms, supra* note 21.

discrimination requirements.[24] Apps using the API must also obtain user consent for both app installation and the processing and sharing of positive diagnoses.[25] The apps must also allow users to uninstall the apps.[26] PHAs retain the power to determine the criteria to trigger an exposure notification and app customization, such as adding a symptom tracker or case mapper (*e.g.*, the contact tracing app used in the United Kingdom).[27]

Some locales have cited inadequate technical expertise and lack of resources as a barrier to implementing contact tracing or exposure notification apps.[28] In September 2020, Apple and Google launched Exposure Notification Express, making exposure notification functionality a native component in operating systems of Apple and Android devices, which removed the need to download an app and lowered the barrier to entry for PHAs.[29] Individuals merely need to opt-in to participation following a system update, sidestepping the hurdle of downloading a specialized app.[30] However, functionality is only available when supported by a PHA that must deploy a "test verification server"[31] to validate positive diagnoses during key uploads, and a "key server"[32] to handle key uploads and downloads.

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24 *Id.*

25 *See id.* (noting that the technology only works if users "decide to opt-in" and that if a user changes their mind, they "can turn it off at any time"); Matt Burgess, *Everything You Need to Know About the New NHS Contact Tracing App*, WIRED (Oct. 22, 2020, 11:45 BST), https://www.wired.co.uk/article/nhs-covid-19-tracking-app-contact-tracing [https://perma.cc/R8UM-QLL4].

26 Burgess, *supra* note 25.

27 *Id.*

28 Jon Swartz, *Apple, Google Enhance Contact-Tracing Technology to Help Combat COVID-19*, MARKETWATCH (Sept. 1, 2020, 12:02 PM), https://www.marketwatch.com/story/apple-google-enhance-contact-tracing-technology-to-help-combat-covid-19-2020-09-01 [https://perma.cc/TC9W-LKTA].

29 *Supporting Exposure Notifications Express*, APPLE DEV., https://developer.apple.com/documentation/exposurenotification/supporting_exposure_notifications_express [https://perma.cc/RN75-C43Q] (noting that the system includes the same privacy protections as the GAEN API, and may be utilized concurrently with the API for apps).

30 *Setting Up an Exposure Notifications Express Test Verification Server*, APPLE DEV., https://developer.apple.com/documentation/exposurenotification/supporting_exposure_notifications_express/setting_up_an_exposure_notifications_express_test_verification_server [https://perma.cc/JXZ7-BX5Z].

31 *Id.*

32 *Configuring a Key Server for Exposure Notifications Express*, APPLE DEV., https://developer.apple.com/documentation/exposurenotification/supporting_exposure_notifications_

PHAs remain responsible for determining risk exposure and customizing system notifications and alerts. Washington, D.C., Maryland, Nevada, and Virginia are expected to be among the first U.S. states and territories to implement Exposure Notification Express, with others likely to follow.[33]

1. Issues of Interoperability

For contact tracing to be effective, an app or digital tool from one state must be cross-compatible with those developed in another state. With people increasingly travelling across state borders, the ability for apps and digital tools to recognize one another is absolutely crucial for tracing exposures and preventing new hotspots of infection from emerging.[34] Inconsistencies between state-level contact tracing apps could cause significant interoperability issues, particularly if some apps are centralized and others are decentralized.[35] The Centers for Disease Control and Prevention (CDC) has stated that if apps are not interoperable, this could add burden on PHAs for integrating data seamlessly into their case management, contact tracing systems, and workflows, which would further exacerbate issues of siloed data management amongst state authorities.[36]

The European Data Protection Board (EDPB) has encouraged European Member States to have "a common European approach in

express/configuring_a_key_server_for_exposure_notifications_express [https://perma.cc/6PPJ-ZZRV].

33 Darrell Etherington, *Apple Launches COVID-19 'Exposure Notification Express' with iOS 13.7—Android to Follow Later This Month*, TECHCRUNCH (Sept. 1, 2020, 12:00 PM), https://techcrunch.com/2020/09/01/apple-launches-system-level-covid-19-exposure-notification-express-with-ios-13-7-google-to-follow-later-this-month [https://perma.cc/294G-ABT8].

34 EUROPEAN DATA PROT. BD., STATEMENT ON THE DATA PROTECTION IMPACT OF THE INTEROPERABILITY OF CONTACT TRACING APPS (2020), https://edpb.europa.eu/sites/edpb/files/files/file1/edpb_statementinteroperabilitycontacttracingapps_en_0.pdf [https://perma.cc/K7RU-EUAS] [hereinafter EDPB, DATA PROTECTION IMPACT]; *see also* Marshall Allen, *Cellphone Data Shows How Las Vegas Is "Gambling with Lives" Across the Country*, PROPUBLICA (Aug. 18, 2020, 5:00 AM), https://www.propublica.org/article/cellphone-data-shows-how-las-vegas-is-gambling-with-lives-across-the-country [https://perma.cc/VM96-RPBG].

35 Kelly Servick, *COVID-19 Contact Tracing Apps Are Coming to a Phone Near You. How Will We Know Whether They Work?*, SCIENCE (May 21, 2020, 5:10 PM), https://www.sciencemag.org/news/2020/05/countries-around-world-are-rolling-out-contact-tracing-apps-contain-coronavirus-how [https://perma.cc/ZU2C-YYSV]; EDPB, DATA PROTECTION IMPACT, *supra* note 34; Allen, *supra* note 34.

36 CDC, CASE INVESTIGATION AND CONTACT TRACING, *supra* note 1.

response to the current crisis, or at least put in place an interoperable framework."[37] The EDPB stated that "[i]n order to promote the effective application of data protection principles, a common level of data minimisation and a common data retention period should be considered."[38] The EDPB also stressed that interoperability should not lead to increased collection of information, due to a lack of coordinated approach, or to decreased data security or data accuracy.[39] Furthermore, the EDPB stated that "ensuring interoperability of [contact tracing apps with different underlying approaches] is technically challenging and may require substantial financial and engineering effort."[40]

North Dakota, South Dakota, Utah, and Rhode Island were among the first to implement contact tracing apps not based on the Apple Google API.[41] In contrast to these contact tracing apps, which are centralized and can be location- or Bluetooth-based, exposure notification apps are decentralized Bluetooth-based apps that can use the GAEN API. A few states in the United States have initiated development of their own exposure notification apps, with Virginia[42] being the first state to deploy an official app, followed by Alabama, North Dakota, and Wyoming.[43] With the use of the GAEN API, there is potential for these and other state-level exposure notification apps to be connected via shared protocols to streamline data collection and

37 EDPB, DATA PROTECTION IMPACT, *supra* note 34, at 1.

38 *Id.* at 4.

39 *Id.*

40 *Id.* at 2.

41 *Healthy Together App*, UTAH.GOV, https://coronavirus.utah.gov/healthy-together-app [https://perma.cc/PT4K-AXSL]; *see also Care19 Alert*, ND.GOV, https://ndresponse.gov/covid-19-resources/care19 [https://perma.cc/8DWR-K77A]; *Care19 Diary App*, COVID-19 IN SOUTH DAKOTA, https://covid.sd.gov/care19app.aspx [https://perma.cc/PBT4-ED2Q]; *Crush COVID RI*, R.I. DEP'T OF HEALTH, https://covid.ri.gov/protect-your-household/crush-covid-ri [https://perma.cc/DXM8-EKSQ].

42 Sarah McCammon, *Virginia Unveils App to Aid Contact Tracing*, NPR (Aug. 5, 2020, 5:14 PM), https://www.npr.org/sections/coronavirus-live-updates/2020/08/05/899414953/virginia-unveils-app-to-aid-contact-tracing [https://perma.cc/4HLZ-N4WH].

43 Paresh Dave, *Three More U.S. States Launching Coronavirus Exposure Warning Apps*, REUTERS (Aug. 13, 2020, 4:01 PM), https://www.reuters.com/article/us-health-coronavirus-apps-idUSKCN2592WR [https://perma.cc/97W3-2PS4].

sharing.[44] In mid-July 2020, the Association of Public Health Laboratories also announced that it will host a national key server to support all U.S. states, allowing exposure notification app users to receive alerts even when travelling across state borders.[45] Additionally, Google updated its Exposure Notification System to provide PHAs more flexibility in determining the level of risk associated with detected exposure, improve accuracy detection, and support for inter-country interoperability.[46]

Interstate interoperability for both contact tracing and exposure notification apps could be authorized and implemented through the U.S. Congress's power to regulate interstate commercial activity.[47] Some states may instead argue that public health measures, such as involuntary quarantines, are reserved for states to use at their discretion.[48] It is in absence of federal regulation that states and territories retain the ability to exercise their powers to establish protocols, which could undermine interoperability.[49] Furthermore, the complete lack of a federal solution creates an imbalance between states with varying levels of funding and technological sophistication among their public health departments. This imbalance creates a unique opportunity for private sector actors like "Big Tech" firms to effectively parachute into public health departments and provide turn-

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44 *Privacy in the Time of COVID-19*, BBB NAT'L PROGRAMS (May 27, 2020), https://betterbusiness.blubrry.com/2020/05/27/privacy-in-the-time-of-covid-19 [https://perma.cc/4LVT-9XCM].

45 *Bringing COVID-19 Exposure Notification to the Public Health Community*, ASS'N PUB. HEALTH LAB'YS (July 17, 2020), https://www.aphlblog.org/bringing-covid-19-exposure-notification-to-the-public-health-community [https://perma.cc/H29Y-RRMX].

46 Burke, *supra* note 5.

47 *See* U.S. CONST. art. I, § 8, cl. 3 (establishing that the "Commerce Clause" provides Congress the power "[t]o regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes").

48 Compagnie Francaise de Navigation a Vapeur v. State Bd. of Health, 186 U.S. 380 (1902).

49 Clason v. Indiana, 306 U.S. 439 (1939). In South Carolina, the legislature passed a bill at the end of June 2020 that prevented the expenditure of federal COVID-19 relief funds by the local health department for "any applications created for [contact tracing] on a cellular device." A Joint Resolution to Authorize the Expenditure of Federal Funds Disbursed to the State in the Coronavirus Aid, Relief, and Economic Security Act, and to Specify the Manner in Which the Funds May be Expended, 2020 S.C. Acts 142; *see also* Coronavirus Aid, Relief, and Economic Security (CARES) Act, Pub. L. No. 116-136, 134 Stat. 281 (2020). Within a week, the California legislature passed a similar bill to prevent federal funding for contact tracing from being "used by any state or local entity for applications that collect information related to an individual's location and movement." An Act to Amend the Budget Act of 2020, 2020 Cal. Stats. ch. 7, § 11.95.

key contact tracing solutions, as seen with GAEN.[50] In practice, states (which often have small cybersecurity budgets) must contract with a private developer to develop an app, host the data if centralized, and maintain information security.[51] Divergence between state-offered apps could result in multiple apps with differing security issues.

B. *Designing Contact Tracing Apps*

The two major technologies involved in app development are Global Positioning System (GPS) technology (associated with location data) and Bluetooth technology (associated with proximity data).[52] While some countries have adopted privacy-invasive surveillance strategies that rely on multiple pieces of personal information,[53] others instead have developed contact tracing apps for individuals to download onto their smartphones including: (1) centralized location-based apps that typically rely on GPS location, WiFi, and cell tower data; (2) centralized Bluetooth-based apps; and (3) decentralized Bluetooth-based apps, as in exposure notification apps.[54]

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50 Paresh Dave, *Google Says 20 U.S. States, Territories 'Exploring' Contact Tracing Apps*, REUTERS (July 31, 2020, 1:40 PM), https://www.reuters.com/article/us-health-ooronavirus-apps/google-says-20-u-s-states-territories-exploring-contact-tracing-apps-idUSKCN24W2P1 [https://perma.cc/9YM9-JAXN].

51 Gregory Barber, *Google and Apple Change Tactics on Contact Tracing Tech*, WIRED (Sept. 1, 2020, 2:42 PM), https://www.wired.com/story/google-apple-change-tactics-contact-tracing-tech [https://perma.cc/QLD5-5YLK] (noting that "it was up to states to build apps . . . and integrate them into their public health response").

52 JOHNS HOPKINS PROJECT ON ETHICS & GOVERNANCE OF DIGIT. CONTACT TRACING TECHS., DIGITAL CONTACT TRACING FOR PANDEMIC RESPONSE: ETHICS AND GOVERNANCE GUIDANCE 35–42 (Jeffrey P. Kahn ed., 2020), https://muse.jhu.edu/book/75831/pdf [https://perma.cc/7G37-46ZB] [hereinafter JOHNS HOPKINS PROJECT].

53 *Digital Contact Tracing*, *supra* note 4 (noting that China, South Korea, and Taiwan adopted privacy-invasive surveillance approaches for aggregating data on people who have tested positive for SARS-CoV-2, combining personal information from a variety of sources including closed-circuit television footage, credit-card transactions, and location data from cell-phone carriers).

54 Patrick Howell O'Neill, Tate Ryan-Mosley & Bobbie Johnson, *A Flood of Coronavirus Apps Are Tracking Us. Now It's Time to Keep Track of Them*, MIT TECH. REV. (May 7, 2020), https://www.technologyreview.com/2020/05/07/1000961/launching-mittr-covid-tracing-tracker [https://perma.cc/WD5F-WQ9J]; *see also* Apple & Google, *Privacy-Preserving Contact Tracing*, APPLE, https://www.apple.com/covid19/contacttracing [https://perma.cc/R56Q-LDCX].

1. Centralized Location-Based Apps

Centralized location-based contact tracing apps were the first to be deployed during the beginning months of the pandemic, such as Israel's "HaMagen" in March 2020.[55] Within this design category, location data is typically stored in two main ways. Israel's app stores data on the internal memory of mobile devices, and with consent, this data may be transferred to a centralized server if an individual tests positive for SARS-CoV-2.[56] In contrast, Norway, Bahrain, and Kuwait opted for apps that carry out "live or near-live tracking of users' locations by frequently uploading GPS coordinates to a central server."[57] This information is easily linked to individual users, as each of these countries requires users to register with a national ID number or valid phone number.[58]

However, GPS technology has documented issues with pinpointing a device's movements, particularly in instances requiring differentiation between adjoining buildings.[59] Experts have stated, "[c]urrent localization technologies [*i.e.*, GPS location and WiFi] are not as accurate as the use of Bluetooth-based proximity detection, and may not be accurate enough to be consistent with medically suggested

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55 Tova Cohen, *1.5 Million Israelis Using Voluntary Coronavirus Monitoring App*, REUTERS (Apr. 1, 2020, 8:58 AM), https://www.reuters.com/article/us-health-coronavirus-israel-apps/1-5-million-israelis-using-voluntary-coronavirus-monitoring-app-idUSKBN21J5L5 [https://perma.cc/J72X-YT83].

56 *Hamagen Privacy Policy*, MINISTRY OF HEALTH (June 17, 2020, 11:49 AM), https://govextra.gov.il/ministry-of-health/hamagen-app/Privacy-policy-EN [https://perma.cc/8GP7-JS6T].

57 *Bahrain, Kuwait and Norway Contact Tracing Apps Among Most Dangerous for Privacy*, AMNESTY INT'L (June 16, 2020, 06:40 UTC), https://www.amnesty.org/en/latest/news/2020/06/bahrain-kuwait-norway-contact-tracing-apps-danger-for-privacy [https://perma.cc/6MAN-GP4K] [hereinafter *Bahrain*]. Due to proportionality concerns associated with this design, highlighted in an Amnesty International report, Norway suspended deployment of their app soon after it was released. *See Norway: Halt to COVID-19 Contact Tracing App a Major Win for Privacy*, AMNESTY INT'L (June 15, 2020, 01:05 UTC), https://www.amnesty.org/en/latest/news/2020/06/norway-covid19-contact-tracing-app-privacy-win [https://perma.cc/8UCN-NMEZ].

58 *Bahrain*, *supra* note 57.

59 Thomas Walle, *Marketers Need to Know the Truth About GPS*, ST. FIGHT (Sept. 4, 2018), https://streetfightmag.com/2018/09/04/marketers-need-to-know-the-truth-about-gps/?utm_content=76675208&utm_medium=social&utm_source=linkedin#.X6Z_7Wj0k2w [https://perma.cc/J9HB-3F64].

definitions for exposure."[60] Nevertheless, such tools could be used to support traditional contact tracing efforts, for instance assisting with identification of outbreak hotspots and memory recall of an individual.[61] When deployed for these goals, contact tracing apps, such as Rhode Island's "Crush COVID RI," do not require widespread adoption in order to be effective.[62] However, apps that utilize location-based approaches also bring many more surveillance risks, issues with public trust, and challenges in fully anonymizing data,[63] as location data is very sensitive and difficult to truly anonymize.[64]

2. Centralized Bluetooth-Based Apps

Bluetooth technology is associated with fewer privacy risks than GPS and may also provide more accurate proximity data due to its increased precision (albeit at shorter range), though some have argued to the contrary.[65] Bluetooth does require a bit of lag time for phones to sync to share information with those nearby.[66] Additionally, the technology also struggles to determine whether a device is one or ten meters away from another device[67]—a crucial distinction for contact

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60 JUSTIN CHAN ET AL., PACT: PRIVACY-SENSITIVE PROTOCOLS AND MECHANISMS FOR MOBILE CONTACT TRACING 13 (2020), https://arxiv.org/pdf/2004.03544.pdf [https://perma.cc/6EAP-UUUG].

61 ECDC, MOBILE APPLICATIONS, *supra* note 3.

62 Ferretti, *supra* note 2; *Digital Contact Tracing*, *supra* note 4; *see also Crush COVID RI*, *supra* note 41.

63 *Bahrain*, *supra* note 57; *see also* Yves-Alexandre de Montjoye et al., *On the Privacy-Conscientious Use of Mobile Phone Data*, SCI. DATA, Dec. 11, 2018, at 1, https://www.nature.com/articles/sdata2018286.pdf [https://perma.cc/T4W3-Q4VJ].

64 Luc Rocher, Julien M. Hendrickx & Yves-Alexandre de Montjoye, *Estimating the Success of Re-identifications in Incomplete Datasets Using Generative Models*, NATURE COMMC'NS, July 23, 2019, https://www.nature.com/articles/s41467-019-10933-3.pdf [https://perma.cc/XX45-ELZ9].

65 JOHNS HOPKINS PROJECT, *supra* note 52.

66 DOUGLAS J. LEITH & STEPHEN FARRELL, CORONAVIRUS CONTACT TRACING: EVALUATING THE POTENTIAL OF USING BLUETOOTH RECEIVED SIGNAL STRENGTH FOR PROXIMITY DETECTION (2020), https://arxiv.org/pdf/2006.06822.pdf [https://perma.cc/6LQD-PA8B]; *see also* Casey Newton, *Why Bluetooth Apps Are Bad at Discovering New Cases of COVID-19*, VERGE (Apr. 10, 2020, 6:00 AM), https://www.theverge.com/interface/2020/4/10/21215267/covid-19-contact-tracing-apps-bluetooth-coronavirus-flaws-public-health [https://perma.cc/K2QD-4KFA].

67 Sam Biddle, *The Inventors of Bluetooth Say There Could Be Problems Using Their Tech for Coronavirus Contact Tracing*, INTERCEPT (May 5, 2020, 6:00 AM), https://theintercept.com/2020/05/05/coronavirus-bluetooth-contact-tracing [https://perma.cc/3JSC-6GSZ].

tracing, where the former may be categorized as an epidemiological contact and the latter would not.[68]

The inherent measurement error of Bluetooth technology can potentially deliver a number of false positive proximity events, whereby the app notifies a user that they may have been exposed in a proximity event when they actually have not been exposed.[69] Besides leading to unnecessary anxiety and interference with a person's life, false positives also strain testing capacity[70] and may lead to notification fatigue, causing individuals to lose faith in the efficacy of the system and stop acting on its recommendations.[71] There are also concerns of false negatives, which are exceptionally worrisome as it equates to Bluetooth devices being unable to sync and thus failing to identify a true exposure at scale.[72]

Several countries, including Singapore, Australia, France, and the United Kingdom, have utilized centralized Bluetooth-based apps. The U.K.'s National Health Service (NHS) app,[73] which launched in May 2020,[74] required individuals who tested positive for SARS-CoV-2 to upload both their personal phone ID code and the phone IDs of recent contacts to a central server. The NHS app allows individuals to upload their own randomized anonymized ID to a central database. Then, the app routinely checks for "matches" with other persons who have tested

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68 Majumder & Desai, *supra* note 6; *see also* LEITH & FARRELL, *supra* note 66; Newton, *supra* note 66.

69 LEITH & FARRELL, *supra* note 66, at 9−10.

70 *See* Andy Crocker, Kurt Opsahl & Bennett Cyphers, *The Challenge of Proximity Apps for COVID-19 Contact Tracing*, ELEC. FRONTIER FOUND. (Apr. 10, 2020), https://www.eff.org/deeplinks/2020/04/challenge-proximity-apps-covid-19-contact-tracing [https://perma.cc/EES4-QPNS].

71 Natasha Lomas, *NHS COVID-19: The UK's Coronavirus Contacts-Tracing App Explained*, TECHCRUNCH (May 5, 2020, 2:08 PM), https://techcrunch.com/2020/05/05/nhs-covid-19-the-uks-coronavirus-contacts-tracing-app-explained [https://perma.cc/5Z4G-UMM7].

72 Cristina Menni et al., *Real-Time Tracking of Self-Reported Symptoms to Predict Potential COVID-19*, 26 NATURE MED. 1037, 1038–39 (2020); *see also* Thorin Klosowski, *COVID Contact Tracing Apps Are Far from Perfect*, N.Y. TIMES: WIRECUTTER (Nov. 2, 2020), https://www.nytimes.com/wirecutter/blog/covid-contact-tracing-apps [https://perma.cc/ZD96-6ETY].

73 *NHS App*, NHS, https://www.nhs.uk/using-the-nhs/nhs-services/the-nhs-app [https://perma.cc/A65M-T822].

74 Simon Murphy, Dan Sabbagh & Alex Hern, *Piloted in May, Ditched in June: The Failure of England's COVID-19 App*, GUARDIAN (June 18, 2020, 15:05 EDT), https://www.theguardian.com/world/2020/jun/18/piloted-in-may-ditched-in-june-the-failure-of-englands-covid-19-app [https://perma.cc/N3FK-JBV4].

positive and were previously in their vicinity.[75] Although these IDs are "anonymized," officials are still able to view the entire network of contacts.[76] The centralized design allows health officials and researchers to check whether the appropriate individuals are receiving notifications.[77] They can view all smartphones that receive an alert and whether those users later reported symptoms or a positive test through the app.[78] This additional context can improve calculations about the accuracy of alert notifications, and enable PHAs to suppress notifications in "edge-cases," when risk of inferential re-identification is high.[79]

Ultimately, the U.K. government abandoned the NHS app for a decentralized model once the technical and interoperability limitations of the centralized model became evident.[80] During testing, the NHS app logged only one out of twenty-five contacts between people when it was used on iPhones.[81] The French and Australian apps also have similar accuracy challenges, resulting in 460,000 of the nearly two million individuals who installed France's app to uninstall the app soon after downloading it.[82] In general, centralized Bluetooth-based apps struggle to recognize each other, and privacy protections baked

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75 *Id.*

76 Servick, *supra* note 35.

77 *Id.*

78 *Id.*

79 *See* Ian Levy, *The Security Behind the NHS Contact Tracing App*, NAT'L CYBER SEC. CTR. (May 4, 2020), https://www.ncsc.gov.uk/blog-post/security-behind-nhs-contact-tracing-app [https://perma.cc/XF2K-SLAP] (providing an example of an "edge-case": "[T]hink about an elderly couple who are shielding and so don't go out. They only see one other person who visits them a few times a week. If one of their apps notifies them they've been in contact with someone who's symptomatic, it's obviously their only visitor. It's a policy decision whether you suppress that notification or not, but the system has to be able to manage these sorts of things technically in whatever model is used.").

80 Murphy et al., *supra* note 74; *see also* Charlotte Jee, *The UK Is Abandoning Its Current Contact Tracing App for Google and Apple's System*, MIT TECH. REV. (June 18, 2020), https://www.technologyreview.com/2020/06/18/1004097/the-uk-is-abandoning-its-current-contact-tracing-app-for-google-and-apples-system [https://perma.cc/D2VV-DNEF].

81 James Cook, *NHS Covid-19 App: How Does Track and Trace Work, and What Does the 'Possible Exposure' Message Mean?*, TELEGRAPH (Dec. 16, 2020, 10:51 AM), https://www.telegraph.co.uk/technology/2020/07/15/track-trace-app-uk-google-apple-when-download [https://perma.cc/8F6J-NMPP].

82 Romain Dillet, *French Contact-Tracing App StopCovid Has Been Activated 1.8 Million Times but Only Sent 14 Notifications*, TECHCRUNCH (June 23, 2020, 6:11 AM), https://techcrunch.com/2020/06/23/french-contact-tracing-app-stopcovid-has-been-activated-1-8-million-times-but-only-sent-14-notifications [https://perma.cc/3JEE-8SAX].

into operating systems may prevent Bluetooth from continually sending out signals or passively scanning in the background.[83] Additionally, requiring individuals to always have Bluetooth enabled on their mobile devices, as well as having their devices remain constantly unlocked and apps open, is not only a major inconvenience and battery drain,[84] but also increases the risk of malicious actors hacking into user mobile devices for other criminal means.[85]

3. Decentralized Bluetooth-Based Apps

Decentralized Bluetooth-based apps that utilize the GAEN API do not suffer from the same technical limitations. Many countries, including Belgium, Estonia, Finland, and Switzerland, have opted for the decentralized approach where the data related to a cellphone's recent interactions are isolated to only that device.[86] This prevents the government, or any other centralized entity such as Apple or Google, from collecting a user's proximity information—greatly reducing privacy and data security risks. Preliminary adoption evidence from the Swiss app demonstrates a proof-of-principle that digital contact tracing could be an effective complementary tool for reducing the spread of COVID-19.[87]

Over the past few months, privacy-minded research groups have led the charge for developing more widely-accepted protocols, including the DP-3T[88] and Private Automated Contact Tracing

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83 Jules Polonetsky, *FPF CEO: Will I Install an Exposure Notification App? Thoughts on the Apple-Google API*, FUTURE OF PRIV. F. (Aug. 31, 2020), https://fpf.org/2020/05/20/fpf-ceo-will-i-install-an-exposure-notification-app-thoughts-on-the-apple-google-api [https://perma.cc/83JY-UZLF] (explaining that privacy protections prevent misuse by governments, stalkers, criminals, and marketers, but also undermine contact tracing functionality).

84 *See, e.g.*, Chevaugn Powell, *Is Your iPhone Battery Draining Fast? Here's a Simple Fix*, TECHNOBEZZ (Dec. 11, 2020), https://www.technobezz.com/iphone-battery-drains-fast [https://perma.cc/YV86-JC4Y].

85 *See* Editorial, *COVID-19 Digital Apps Need Due Diligence*, 580 NATURE 563, 563 (2020), https://media.nature.com/original/magazine-assets/d41586-020-01264-1/d41586-020-01264-1.pdf [https://perma.cc/9LSK-L9KX].

86 O'Neill et al., *supra* note 54 (explaining that in decentralized tracing, matching is performed on each user's device, rather than matching user ID's in a centralized location).

87 *See generally* Marcel Salathé et al., *Early Evidence of Effectiveness of Digital Contact Tracing for SARS-CoV-2 in Switzerland*, SWISS MED. WKLY. (Dec. 16, 2020), https://smw.ch/article/doi/smw.2020.20457 [https://perma.cc/DM5S-PMY7].

88 TRONCOSO ET AL., *supra* note 22.

(PACT).[89] Privacy advocates have also encouraged decentralized approaches for contact tracing apps, arguing that the decentralized approaches leave data related to users' social networks less vulnerable to hacking or exploitation.[90] The European Parliament has also explicitly favored the decentralized approach.[91] Unfortunately, the United States continues to lag in national efforts to implement an appropriate digital contact tracing network and is relying on each state to develop apps that must be epidemiologically relevant for nationwide, and even potentially global, contact tracing while maintaining privacy and security standards.[92]

C. *Are Apps Even Necessary?*

As established, the concept of digital contact tracing is similar to that of traditional methods,[93] where individuals are asked to voluntarily self-isolate and monitor for symptoms based on their previous proximity to an infected person—the key difference now being the potential use of mobile devices and wearable technology to identify exposure events, and in some cases, to enable latent tracking of an individual's actual location and movements.[94] It is important to stress that contact tracing and exposure notification apps should be considered only as a supplement to other traditional and ongoing

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89 CHAN ET AL., *supra* note 60.

90 *See* Tim Starks, *Early Covid-19 Tracking Apps Easy Prey for Hackers, and It Might Get Worse Before It Gets Better*, POLITICO (July 6, 2020, 7:00 AM), https://www.politico.com/news/2020/07/06/coronavirus-tracking-app-hacking-348601 [https://perma.cc/L4VL-PSHQ]. Additionally, various types of attacks are also possible by malicious actors to create a false surge in exposure notifications. At best, this could create undue anxiety and undermine the integrity of the data. At worst, this could theoretically enable a hostile foreign government to dissuade voters from turning out to vote, thus undermining the integrity of a political election.

91 Resolution on EU Coordinated Action to Combat the COVID-19 Pandemic and Its Consequences, EUR. PARL. DOC. P9_TA(2020)0054 (2020), https://www.europarl.europa.eu/doceo/document/TA-9-2020-0054_EN.html [https://perma.cc/FX87-9M6W].

92 In a nationwide pandemic, the government could also utilize other means to nationally collect and process contact tracing information, such as through the emergency powers outlined in the Stafford Disaster Relief and Emergency Assistance Act, Pub. L. No. 100-707, 102 Stat. 4689 (1988) (codified as amended at 42 U.S.C. §§ 5121−5208). Those emergency powers could entitle the Federal Emergency Management Agency to fund public assistance programs at the federal level, but as of this writing any emergency funding for contact tracing is distributed to state, local, tribal, and territorial entities.

93 CDC, CASE INVESTIGATION AND CONTACT TRACING, *supra* note 1.

94 Ferretti et al., *supra* note 2.

public health response efforts. Placing too much significance and trust in location or proximity data as a panacea capable of stopping the spread of the disease is not only naive, but also creates a false sense of security for the general public.

Furthermore, aiming for tech exceptionalism and individualism in the context of contact tracing and exposure notification apps decreases their effectiveness and increases privacy risks. The creation of digital contact tracing and exposure notification tools should be viewed as a complement to improving diagnostic, screening, and surveillance testing initiatives. Additionally, contact tracing technologies should encourage ongoing relationships between the public and PHAs.[95] Digital contact tracing apps and exposure notification tools would be of most use when incorporated in an ecosystem that involves the expansion of local, community workers to collect contact tracing data in confidence.[96]

Effective digital contact tracing necessitates credible and equitable public health response. Ongoing discussions on success of contact tracing apps have been primarily concerned with adoption[97]—not the actual fidelity of the tracing and notification systems. While decentralized Bluetooth-based designs are the primary choice for digital tools, technological limitations with proximity data mean that manual review will still be necessary.[98] To date, there is still no nationwide contact tracing app, leaving state and local authorities in charge of contact tracing whether in-person or via digital means. Neither the U.S. Department of Health and Human Services (HHS) nor the CDC—nor any other U.S. federal agency—appears interested in deploying a nationwide contact tracing app, burdening states with

95 *See* CDC, CASE INVESTIGATION AND CONTACT TRACING, *supra* note 1.

96 *See id.*

97 Alejandro de la Garza, *Contact Tracing Apps Were Big Tech's Best Idea for Fighting COVID-19. Why Haven't They Helped?*, TIME (Nov. 10, 2020 7:00 AM), https://time.com/5905772/covid-19-contact-tracing-apps [https://perma.cc/R83Q-Q5YY]; *see also* Sarah Kreps, Baobao Zhang & Nina McMurry, *Contact-Tracing Apps Face Serious Adoption Obstacles*, BROOKINGS INST. (May 20, 2020), https://www.brookings.edu/techstream/contact-tracing-apps-face-serious-adoption-obstacles [https://perma.cc/QQW3-3APE].

98 Bluetooth technology could pose a problem for people on airplanes (close proximity) or if people leave their phones when they go to various venues. Furthermore, digital tools are limited in that they only discern distance and time and do not account for PPE or potential barriers, like people in cars.

not only the responsibility of developing an app but also regulating it.[99]

The inability to have a one-size-fits-all solution should not stop the development of a national network that uses experts from relevant sectors to create a balanced contact tracing initiative. This requires that public health authorities and digital surveillance tool developers consider the following: (1) regulating standards for universal usability and accessibility, as well as incentivization, to promote adoption of and engagement with apps; (2) practices that are feasible for individuals with older mobile devices and non-smartphones; (3) state- versus federal-level issues regarding biometric privacy regulations, interoperability of apps across state boundaries, and enforcement of app usage in varying jurisdictions; and (4) security and privacy laws and rulings regarding health information and collection of mobile data.[100]

It is particularly important that epidemiological and public health initiatives are equally integrated into a framework that involves regulation of privacy protections[101] for mobile surveillance including transparency, adequately encrypted data management, limited scope of purposes and temporal limitations for collected data, anonymity, and informed consent.

II. PUBLIC HEALTH CONSIDERATIONS

Current evidence that COVID-19 contact tracing and exposure notification apps would help control the epidemic is limited[102] and fails to account for issues of public literacy, privacy rights and regulations, and digital inequities. A popularly cited model originating from a team at the University of Oxford was misreported as suggesting

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99 Andy Greenberg, *State-Based Contact Tracing Apps Could Be a Mess*, WIRED (May 27, 2020, 7:00 AM), https://www.wired.com/story/covid-19-contact-tracing-app-fragmentation [https://perma.cc/M6PF-Y5BC].

100 Majumder & Desai, *supra* note 6.

101 BENJAMIN BOUDREAUX ET AL., RAND CORP., STRENGTHENING PRIVACY PROTECTIONS IN COVID-19 MOBILE PHONE–ENHANCED SURVEILLANCE PROGRAMS (2020), https://www.rand.org/content/dam/rand/pubs/research_briefs/RBA300/RBA365-1/RAND_RBA365-1.pdf [https://perma.cc/CMR3-6DRL].

102 *Digital Contact Tracing*, *supra* note 4.

that COVID-19 apps need to be used by at least 60%[103] of the population to control the current coronavirus outbreak.[104] More recently, Oxford researchers have published further research that suggests digital contact tracing can help to control an epidemic at low levels of app uptake.[105] Other COVID-19 researchers also state that adoption at lower levels would still have a positive effect on curbing the spread.[106] However, others have suggested that contact tracing should occur at least at a 50% level to have a beneficial reduction in community spread.[107]

Nevertheless, the 60% figure has been frequently misreported in the United States,[108] and has arguably impacted policy decisions related to contact tracing apps, leading some experts to call for contact tracing apps to be mandatory[109] and for others to lose hope in the technology.[110] In reality, contact tracing apps are not a zero-sum proposition, but rather one tool—once appropriately developed and regulated—to supplement other response efforts to reduce the rate of transmission.[111] Recognizing this, the Massachusetts Institute of

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103 *Id.* This is assuming that neither traditional contact tracing nor widespread social distancing rules are implemented and persons over seventy remained in lockdown. It is also important to note that contact tracing apps for different diseases are not necessarily going to have the same threshold needed for effectiveness.

104 *Id.* The original Oxford study actually states, "[o]ur models show we can stop the epidemic if approximately 60% of the population use the app, and even with lower numbers of app users, we still estimate a reduction in the number of coronavirus cases and deaths." *Id* (quoting Christophe Fraser).

105 *See generally* MATTHEW ABUEG ET AL., MODELING THE COMBINED EFFECT OF DIGITAL EXPOSURE NOTIFICATION AND NON-PHARMACEUTICAL INTERVENTIONS ON THE COVID-19 EPIDEMIC IN WASHINGTON STATE (2020), https://www.medrxiv.org/content/10.1101/2020.08.29.20184135v1.full.pdf [https://perma.cc/D8NL-W3JJ].

106 *See* Servick, *supra* note 35; *see also* Patrick Howell O'Neill, *Coronavirus Tracing Apps Can Save Lives Even with Low Adoption Rates*, MIT TECH. REV. (Sept. 2, 2020), https://www.technologyreview.com/2020/09/02/1007947/coronavirus-contact-tracing-apps-save-lives-low-15-percent-adoption-rates [https://perma.cc/G4DA-P5YC].

107 Alyssa Bilinski, Farzad Mostashari & Joshua A. Salomon, *Modeling Contact Tracing Strategies for COVID-19 in the Context of Relaxed Physical Distancing Measures*, JAMA NETWORK OPEN, Aug. 21, 2020, https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2769618 [https://perma.cc/AG7V-AHBB].

108 *See, e.g.*, Sarah Kreps et al., *supra* note 97.

109 Jane Bambauer et al., *It's Time to Get Real About COVID Apps*, MEDIUM (May 14, 2020), https://medium.com/@DataVersusCovid/its-time-to-get-real-about-covid-apps-dd82e08895f2 [https://perma.cc/TGT9-GRE5].

110 Kreps et al., *supra* note 97.

111 Princeton University, Center for Information Technology Policy, *Webinar: Ed Felten—COVID-19, Technology, Privacy and Civil Liberties*, YOUTUBE (Apr. 21, 2020), https://

Technology has clarified and reiterated that adoption at rates lower than 60% may have an impact on controlling an outbreak.[112] Regardless, without considering the social inequities and inequalities, the efficacy and ease of success for such applications should still be questioned.[113] As researchers and app developers around the world race to build and refine these digital tools, it is important to consider issues needed to win public trust and therefore widespread adoption of this measure.

A. *Usability Across Disparate Populations*

Approximately 95% of the U.S. population owns a cellphone, but only about 85% of individuals currently own a smartphone.[114] Proactive measures must be taken to mitigate this inherent bias against those less likely to own a smartphone or have internet access, including individuals who have lower educational attainment, lower income earnings, are of a racial minority population, live in rural areas, and/or are of senior age.[115] Concentrating on a population that potentially biases against these individuals means that usage of these apps would also be biasing against persons who are more likely to be without adequate healthcare access and/or are vulnerable to poorer

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www.youtube.com/watch?v=miOgq5Q5EC0 [https://perma.cc/V5BA-LR44] (stating that there have been a range of claims about effectiveness of contact tracing apps, but instead these apps should be thought of as part of a much broader spectrum of approaches to reduce the rate of transmission; they are not a "silver-bullet solution").

112 Patrick Howell O'Neill, *No, Coronavirus Apps Don't Need 60% Adoption to Be Effective*, MIT TECH. REV. (June 5, 2020), https://www.technologyreview.com/2020/06/05/1002775/covid-apps-effective-at-less-than-60-percent-download [https://perma.cc/R63B-LHGL].

113 Servick, *supra* note 35.

114 *Mobile Fact Sheet*, PEW RSCH. CTR. (June 12, 2019), https://www.pewresearch.org/internet/fact-sheet/mobile/#:~:text=mobile%20revolution%20below.-,Mobile%20phone%20ownership%20over%20time,smartphone%20ownership%20conducted%20in%202011 [https://perma.cc/3X6F-NKDD]; S. O'Dea, *Smartphone Users in the United States 2018−2024*, STATISTA (Apr. 21, 2020), https://www.statista.com/statistics/201182/forecast-of-smartphone-users-in-the-us [https://perma.cc/X3RF-759J].

115 Amalia R. Miller & Catherine E. Tucker, *Can Health Care Information Technology Save Babies?*, 119 J. POL. ECON. 289, 315 (2011) (noting that "technological innovation in health care has often disproportionately benefited those with higher education and more resources" (citation omitted)); *see also* Catherine Tucker & Shuyi Yu, *Does IT Lead to More Equal Treatment? An Empirical Study of the Effect of Smartphone Use on Customer Complaint Resolution* 21 (Mktg. Sci. Inst., Working Paper No. 18-111, 2018), https://www.msi.org/wp-content/uploads/2020/06/MSI_Report_18-111-1.pdf [https://perma.cc/K5W8-W9PB].

health outcomes[116]—a contradictory proposal for an initiative concerned with public health. In this light, special attention should accentuate: (1) how any apps will reflect data from marginalized communities; and (2) should the app indicate infection clusters, the potential impact of labeling such communities as hotspots. Minority communities have experienced higher rates of SARS-CoV-2 infections and COVID-19 cases as a result of systemic issues,[117] and there must be assurances that exposure and tracing data will not be used to further marginalize these communities.

Additional resources to respond to COVID-19 should also be distributed to areas most affected by lack of smartphone access to mitigate these inequalities. Various approaches have already been suggested to increase participation among this demographic. For example, the federal government could distribute wearable tracking beacons for individuals to wear—an approach that is being considered in a number of U.S. schools to overcome smartphone ownership gaps.[118] This would be similar to Singapore, where the government has initiated distribution of "TraceTogether Tokens," wearable tracking devices, to individuals who do not own smartphones (including migrant workers) and those who would prefer to not download an app onto their mobile device.[119] However, this would entail the development of additional security and privacy extensions of current laws to apply to wearable devices.[120] Furthermore, even with these

116 Nicol Turner Lee & Jordan Roberts, *Managing Health Privacy and Bias in COVID-19 Public Surveillance*, BROOKINGS INST. (Apr. 21, 2020), https://www.brookings.edu/blog/techtank/2020/04/21/managing-health-privacy-and-bias-in-covid-19-public-surveillance [https://perma.cc/5VWN-98QD].

117 John Eligon et al., *Black Americans Face Alarming Rates of Coronavirus Infection in Some States*, N.Y. TIMES (Apr. 7, 2020), https://www.nytimes.com/2020/04/07/us/coronavirus-race.html [https://perma.cc/M78R-XR6M].

118 Will Knight, *Schools Turn to Surveillance Tech to Prevent COVID-19 Spread*, WIRED (June 5, 2020, 7:00 AM), https://www.wired.com/story/schools-surveillance-tech-prevent-covid-19-spread [https://perma.cc/TTQ2-SVE2].

119 Saira Asher, *TraceTogether: Singapore Turns to Wearable Contact-Tracing Covid Tech*, BBC NEWS (July 4, 2020), https://www.bbc.com/news/technology-53146360 [https://perma.cc/MQX9-8HGB].

120 According to University College London expert Michael Veale, these wearables present "accountability and privacy concerns." John Geddie & Aradhana Aravindan, *Singapore Plans Wearable Virus-Tracing Device for All*, REUTERS (June 5, 2020, 12:37 AM), https://www.reuters.com/article/us-health-coronavirus-singapore-tech/singapore-plans-wearable-virus-tracing-device-for-all-idUSKBN23C0FO [https://perma.cc/99K5-FHYB]; *see also* Justin Evans &

interventions, the proliferation of uneven broadband access across the United States undermines the effectiveness of digital contact tracing and exposure notification tools, particularly in under-privileged and rural areas.[121]

Any contact tracing and exposure notification app and digital tool that comes to the market needs to be able to work on a variety of devices, especially allowing for interoperability between devices that use different operating systems. Such apps developed with Google and Apple's API will work most effectively on Apple and Android devices, which account for three billion smartphones around the world.[122] However, many smartphones utilize other operating systems, or even older operating systems, considering that most smartphones appear to last approximately two and a half to three years.[123] Furthermore, consideration should be allocated to feature phones, not just smartphones, that use operating systems that would be incompatible with these newly developed apps.

B. *Regulation of Literacy and Disability Compatibility*

App design is crucial for contact tracing and exposure notification apps to truly be considered a universal proposition. This entails requiring the integration of usable, accessible, and universal design concepts for any app that is available on the market.[124] In order to best meet accessibility principles, apps must have a usable design that meets the International Organization of Standardization's (ISO) codes

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Katelyn Ringrose, *From Fitbits to Pacemakers: Protecting Consumer Privacy and Security in the Healthtech Age*, 68 CLEV. ST. L. REV. ET CETERA 1, 7−8 (2019).

121 This issue undermined North Dakota's "Care19" app. *See* Erin Brodwin, *An App for Football Fans Became a Digital Contact Tracing Tool—and Could Be a Litmus Test for Covid-19 Technology*, STAT (June 24, 2020), https://www.statnews.com/2020/06/24/digital-contact-tracing-north-dakota [https://perma.cc/6J37-PQW5].

122 Mark Gurman, *Apple, Google Bring Covid-19 Contact-Tracing to 3 Billion People*, BLOOMBERG (Apr. 10, 2020, 7:53 PM), https://www.bloomberg.com/news/articles/2020-04-10/apple-google-bring-covid-19-contact-tracing-to-3-billion-people [https://perma.cc/4K2H-727A].

123 S. O'Dea, *Replacement Cycle Length of Smartphones in the United States 2014−2024*, *in Years*, STATISTA (Oct. 6, 2020), https://www.statista.com/statistics/619788/average-smartphone-life [https://perma.cc/Y76J-6A2Z].

124 *What Is the Difference Between Accessible, Usable, and Universal Design?*, DO-IT CTR. (Apr. 30, 2019), https://www.washington.edu/doit/what-difference-between-accessible-usable-and-universal-design [https://perma.cc/N579-4264].

for usability.[125] This means that efficiency, efficacy, and satisfaction should drive important features of usability including: (1) maintaining software equality and compatibility;[126] (2) developing the app with a human-centric approach; (3) meeting usability testing and assurance standards; and (4) designing a user interface that drives engagement across all people.[127] User interface design is particularly complex, and if the ISO's guidelines prove too restrictive for app developers, HHS has established a set of interactive user interface guidelines that provide a similar level of considerations for usability while allowing more flexibility for users.[128]

In general, many apps lack accessible design and are poorly adapted for use by disabled people.[129] Approximately 26% of the U.S. population, and about 15% of the global population, lives with some disability.[130] Apple's iOS has special "Accessibility" features for apps,[131] but these features may only enhance user experience and engagement if the user interface is designed to maintain a simple structure and includes easy to read text at an accessible literacy level.[132] This means that developers should consider limiting dynamic

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125 *See generally* Nigel Bevan et al., *New ISO Standards for Usability, Usability Reports and Usability Measures*, *in* HUMAN-COMPUTER INTERACTION: THEORY, DESIGN, DEVELOPMENT AND PRACTICE 268 (Masaaki Kurosu ed., 2016) (explaining the ISO's codes for usability and how they can be used).

126 *See* discussion *supra* Section II.A.

127 *See* Bevan et al., *supra* note 125.

128 U.S. DEP'T OF HEALTH & HUM. SERVS., RESEARCH-BASED WEB DESIGN & USABILITY GUIDELINES (2006), https://www.usability.gov/sites/default/files/documents/guidelines_book.pdf [https://perma.cc/AZT4-EAEX]; KELSEY FINCH ET AL., MIT COMPUTATIONAL L. REP., DIGITAL CONTACT TRACING: A PLAYBOOK FOR RESPONSIBLE DATA USE 14 (2020), https://law.mit.edu/pub/digitalcontacttracingaplaybookforresponsibledatause/release/1 [https://perma.cc/8C6X-98VB]; *see also* Bevan et al., *supra* note 125.

129 The authors follow the terminology of disabled people in this Article to emphasize the view that persons are disabled by a society that has not effectively adapted and equipped itself to allow all persons to engage equally. The authors do acknowledge the importance of person-first speech as well and additionally support the phrasing of persons with disabilities.

130 WORLD HEALTH ORG. & THE WORLD BANK, WORLD REPORT ON DISABILITY 7 (2011), https://apps.who.int/iris/bitstream/handle/10665/70670/WHO_NMH_VIP_11.01_eng.pdf; jsessionid=94D6F1DF2FEDE17B8327C2BB344720AF?sequence=1 [https://perma.cc/F8ZB-MUF4]; *Disability Impacts All of Us*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/ncbddd/disabilityandhealth/infographic-disability-impacts-all.html#:~:text=61%20million%20adults%20in%20the,is%20highest%20in%20the%20South [https://perma.cc/FXS9-AELM]; *see also* FINCH ET AL., *supra* note 128.

131 *Accessibility*, APPLE, https://www.apple.com/accessibility [https://perma.cc/F2C6-DUAJ].

132 MARKO PERIŠA, IVAN CVITIĆ & ROSANA ELIZABETA SENTE, COMPARATIVE ANALYSIS OF MOBILE PHONE APPLICATION SOLUTIONS ACCESSIBILITY FOR INFORMING VISUALLY IMPAIRED

and animated aspects in apps while also using large buttons on static screens.[133] In terms of the text itself, typeface should be of a basic structure and large size to account for those who have various issues with vision.[134] Additionally, contrast ratios and color contrasts are important design aspects that need to be standardized.[135]

Furthermore, the content of the material presented in the app should conform to average literacy capabilities in the United States and provide accurate translations for major non-English languages. Approximately only four in five U.S. adults have English literacy skills to complete low-level inferences, and those who are traditionally non-English speakers are at lower literacy levels overall.[136] Given the disproportionate rates of COVID-19 in communities of color, and communities where English may not be the first or only language spoken in the home,[137] developers should be cognizant of the ways in which their apps can support or hamper the health of users from a design standpoint.

Developers should aim to implement universal design in their contact tracing and exposure notification apps. In this way, the design of the app is such that all people can use the app, to the greatest extent possible, without needing to implement additional parameters for adaptation.[138] Not only are these products designed to minimize or eliminate the addition of extra assistive technologies but are also easily compatible with common assistive technologies and hardware should they be needed.[139] Following rules outlined in the Americans with Disabilities Act,[140] and fostering compliance enforced by FCC and

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PERSONS IN TRAFFIC ENVIRONMENT (2016), https://bib.irb.hr/datoteka/875278.s02p10_002.pdf [https://perma.cc/FJT5-289L]; *see also* Alice Crook et al., *Perspectives of a Mobile Application for People with Communication Disabilities in the Community*, 12 DISABILITY & REHAB.: ASSISTIVE TECH. 184 (2017).

133 *See* PERIŠA ET AL., *supra* note 132; Crook et al., *supra* note 132.

134 *See* PERIŠA ET AL., *supra* note 132; Crook et al., *supra* note 132.

135 *See* PERIŠA ET AL., *supra* note 132; Crook et al., *supra* note 132.

136 U.S. Dep't of Educ., *Adult Literacy in the United States*, INST. OF EDUC. SCIS.: NAT'L CTR. FOR EDUC. STATS. (July 2019), https://nces.ed.gov/datapoints/2019179.asp [https://perma.cc/U5B9-P5SB].

137 Miller & Tucker, *supra* note 115; *see* Eligon et al., s*upra* note 117.

138 *What Is the Difference Between Accessible, Usable, and Universal Design?*, s*upra* note 124.

139 *Id.*

140 Americans with Disabilities Act of 1990 (ADA), Pub. L. No. 101-336, 104 Stat. 327 (codified as amended at 42 U.S.C. §§ 12101–12213).

HHS would help to ensure that developers are truly attempting universal design in their contact tracing and exposure notification apps before releasing those apps to the market.

C. *Adoption Incentivization*

Perhaps the largest obstacle to tackle is the inevitably limited scope and scale of the data collected by contact tracing apps. First, if privacy issues dictate that contact tracing apps must allow for user opt-in, how efficient and effective will these apps even be for epidemiological purposes? A recent survey suggests that over 60% of the U.S. population would likely install a contract tracing app on their smartphones.[141] However, researchers have shown that adoption of new health behaviors relies on a complex relationship of psychological, sociological, and cultural factors at the individual level.[142] Furthermore, it is a difficult undertaking to convince such a majority of the country to: (1) trust in the privacy and security standards implemented; (2) believe in the efficacy of the apps; and (3) actively use the app.[143] By making exposure notification functionality available at the operating system level of Apple and Android devices, the Exposure Notification Express tackles these obstacles head-on for at least exposure notification–based tools.

In the context of centralized apps, there is the potential—albeit of low likelihood[144]—that governments not only use contact tracing apps for disease surveillance, but also use the location or proximity data to enforce travel restrictions and quarantine orders, including validation of fines and potential criminal charges.[145] Privacy advocates continue

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141 Luke Milsom et al., *Survey of Acceptability of App-Based Contact Tracing in the UK, US, France, Germany and Italy*, OSF (July 21, 2020, 6:59 AM), https://osf.io/7vgq9 [https://perma.cc/X7WK-8FCA].

142 *See generally* Michael P. Kelly & Mary Barker, *Why Is Changing Health-Related Behaviour So Difficult?*, 136 PUB. HEALTH 109 (2016).

143 *See* Brooke Auxier, *How Americans See Digital Privacy Issues amid the COVID-19 Outbreak*, PEW RSCH. CTR. (May 4, 2020), https://www.pewresearch.org/fact-tank/2020/05/04/how-americans-see-digital-privacy-issues-amid-the-covid-19-outbreak [https://perma.cc/9GVH-2R7K].

144 A more likely scenario would be mandated use at the level of local entities, such as schools, colleges, workplaces, etc.

145 *See* Samantha Raphelson, *Kentucky Man Accused of Breaking Canada's COVID-19 Rules Faces $569,000 Fine*, NPR (Aug. 25, 2020, 2:49 PM), https://www.npr.org/2020/08/25/

to warn of "mission creep"[146] and that government access to such health information could be used in discriminatory manners, such as the development of "immunity passports" that would allow only those who have not tested positive for SARS-CoV-2 to be able to travel.[147] Additionally, the mandatory use of an app for monitoring locations in the context of quarantine enforcement is challengeable under the *United States v. Jones* test.[148] If the government instead focused on a binary solution for quarantine compliance,[149] this would perhaps be a

905847150/american-man-accused-of-breaking-canadas-covid-19-rules-faces-560-000-fine [https://perma.cc/Z6TU-NFJE]. Quarantine enforcement apps have also been deployed internationally. For instance, in Poland, a quarantine compliance app was implemented which aims to prevent individuals from breaching quarantine by requiring them to self-upload geolocated photos of their face within twenty minutes of receiving a request. *See Home Quarantine*, APPLE: APP STORE PREVIEW, https://apps.apple.com/us/app/home-quarantine/id1502997499 [https://perma.cc/LRD6-JJ3A]. App users are also obliged to immediately notify relevant health departments if they develop any symptoms. *See id.*; *see also* Mark Scott & Zosia Wanat, *Poland's Coronavirus App Offers Playbook for Other Governments*, POLITICO (Apr. 2, 2020, 6:30 AM), https://www.politico.eu/article/poland-coronavirus-app-offers-playbook-for-other-governments [https://perma.cc/HY6J-WCSY].

146 Matthew Guariglia, *The Dangers of COVID-19 Surveillance Proposals to the Future of Protest*, ELEC. FRONTIER FOUND. (Apr. 29, 2020), https://www.eff.org/deeplinks/2020/04/some-covid-19-surveillance-proposals-could-harm-free-speech-after-covid-19 [https://perma.cc/PN7Y-JUSH]. "Mission creep" or "surveillance creep" could involve the use of biometric data in a health-related app being used by law enforcement authorities, employment organizations, and private companies. Such concerns were recently voiced in the U.K. regarding Palantir's partnership with NHS, and Palantir responded that only NHS would retain the aggregated data. Palantir Tech., *Response to Privacy International Open Letter Dated 29 April 2020*, PRIV. INT'L, https://privacyinternational.org/sites/default/files/2020-05/Response%20to%20Privacy%20International%20Open%20Letter%20dated%2029%20April%202020.pdf [https://perma.cc/M5CQ-NJH8].

147 Mark A. Hall & David M. Studdert, *Privileges and Immunity Certification During the COVID-19 Pandemic*, 323 JAMA 2243, 2243−44 (2020). Members of Congress have proposed legislation to bar discriminatory uses of contact tracing apps. *See* Public Health Emergency Privacy Act, S. 3749, 116th Cong. § 3(c) (2020) (introduced by Senators Blumenthal and Warner on May 14, 2020); Exposure Notification Privacy Act, S. 3861, 116th Cong. § 8 (2020) (introduced by Senators Cantwell and Cassidy on June 1, 2020).

148 Alan Z. Rozenshtein, *Disease Surveillance and the Fourth Amendment*, LAWFARE (Apr. 7, 2020, 1:54 PM), https://www.lawfareblog.com/disease-surveillance-and-fourth-amendment [https://perma.cc/M9A7-AHPY] (arguing that "if the government were to track people's movement by directly surveilling cellphones . . . that might violate a person's reasonable expectation of privacy"); *see also* United States v. Jones, 565 U.S. 400, 404−08 (2012) (holding that when the police commit a common law trespass to obtain information, they have committed a Fourth Amendment search).

149 In this context, a binary solution refers to the mere confirmation of whether or not an individual has violated a quarantine order without continued location surveillance. *See* Rozenshtein, *supra* note 148; *see also* Ric Simmons, *The Two Unanswered Questions of* Illinois v. Caballes: *How to Make the World Safe for Binary Searches*, 80 TUL. L. REV. 411, 413–14 (2005); Laurent Sacharoff, *The Binary Search Doctrine*, 42 HOFSTRA L. REV. 1139 (2014).

feasible solution without breaking the law,[150] but this focus on privacy of information fails to consider a person's right to privacy of place.[151]

If individuals feel coerced into adoption, this could undermine trust in public health authorities and other strategies used to mitigate COVID-19. Additionally, mass acceptance of voluntary contact tracing and exposure notification apps may require that individuals believe in the call to action for society as a reason for adopting such public health behaviors.[152] With nearly 40% of COVID-19 infections being asymptomatic,[153] the current acceptance level of public health behaviors,[154] the proliferation of misinformation,[155] and the politicization of scientific and health information,[156] a voluntary effort is unlikely to achieve sufficient scale for properly tracking the spread of the virus. This is especially true without the implementation of a comprehensive nationwide strategy to: communicate the individual and societal benefits; provide monetary and non-monetary incentives; and provide additional assurances that the privacy and fundamental rights of individuals and groups will be protected. For instance, only roughly 4% of Virginia's population downloaded their contact tracing app in the first week of release,[157] with the anticipation that only a

150 Simmons, *supra* note 149 (discussing the constitutional validity of the binary search doctrine); Rozenshtein, *supra* note 148.

151 Sacharoff, *supra* note 149; *see also* Zack Whittaker, *Fearing Coronavirus, a Michigan College Is Tracking Its Students with a Flawed App*, TECHCRUNCH (Aug. 19, 2020, 4:30 PM), https://techcrunch.com/2020/08/19/coronavirus-albion-security-flaws-app [https://perma.cc/DJ4U-SLTT] (demonstrating how the mandatory use of app for monitoring locations in the context of quarantine enforcement fails to consider a person's right to privacy of place); Zeynep Tufekci, *The Pandemic Is No Excuse to Surveil Students*, ATLANTIC (Sept. 4, 2020), https://www.theatlantic.com/technology/archive/2020/09/pandemic-no-excuse-colleges-surveil-students/616015 [https://perma.cc/67WE-TDWY].

152 *Cf.* Katherine White & Bonnie Simpson, *When Do (and Don't) Normative Appeals Influence Sustainable Consumer Behaviors?*, 77 J. MKTG. 78, 78 (2013) (exploring how injunctive appeals, descriptive appeals, and benefit appeals "can encourage consumers to engage in relatively unfamiliar sustainable behaviors").

153 *COVID-19 Pandemic Planning Scenarios*, CTRS. FOR DISEASE CONTROL & PREVENTION (Sept. 10, 2020), https://www.cdc.gov/coronavirus/2019-ncov/hcp/planning-scenarios.html [https://perma.cc/68UW-EDVT].

154 *See generally* Stephan Van den Broucke, *Why Health Promotion Matters to the COVID-19 Pandemic, and Vice Versa*, 35 HEALTH PROMOTION INT'L 181 (2020).

155 *See generally* BOUKOUVALAS ET AL., *supra* note 17.

156 *See generally id.*

157 Dave, *supra* note 43. The 4% calculation is based on the reported 316,000 downloads in the Commonwealth of Virginia compared to the Commonwealth's population of 8.536 million people from the U.S. Census Bureau.

portion of these users will actually use the app appropriately. This contrasts with Ireland's adoption rate of 37% and Germany's adoption rate of over 20%.[158]

Incentivization may be a useful option for promoting enough adoption and use of contact tracing and exposure notification apps to get to a sufficient level of engagement in the United States. To help policymakers and public health experts "revise their messaging and reverse the erosion of government trust," another suggestion might be to link participation with direct benefits,[159] whereby participation is potentially integrated with a wage replacement program set up for the purpose of supporting those affected by COVID-19. Referencing *NFIB v. Sebelius*,[160] Congress could also establish, within a federal framework, a tax incentive for contact tracing app usage—either providing those who engage with the app a type of tax deduction or creating a tax penalty for those who do not follow the mandate. In this way, users would become more likely to opt in for use of contact tracing and exposure notification apps, similar to the influx of Americans who signed up for Affordable Care Act[161] insurance plans.[162] This would create a type of mandatory requirement for usage but still allow users to have the ability to choose to opt in or deal with a monetary penalty. However, economic incentives such as these may also be criticized as a form of economic coercion, with a greater impact on under-privileged communities.

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158 Charlotte Jee, *Is a Successful Contact Tracing App Possible? These Countries Think So.*, MIT TECH. REV. (Aug. 10, 2020), https://www.technologyreview.com/2020/08/10/1006174/covid-contract-tracing-app-germany-ireland-success [https://perma.cc/P37N-GVET].

159 Sarah Holder, *Contact Tracing Is Having a Trust Crisis*, BLOOMBERG: CITYLAB (Aug. 12, 2020, 5:00 AM), https://www.bloomberg.com/news/articles/2020-08-12/why-are-americans-so-uneasy-about-contact-tracing?sref=aGTrSb9U&utm_content=citylab&utm_medium=social&utm_source=twitter&utm_campaign=socialflow-organic [https://perma.cc/L2FR-3F58].

160 NFIB v. Sebelius, 567 U.S. 519 (2012).

161 Patient Protection and Affordable Care Act, Pub. L. No. 111-148, 124 Stat. 119 (2010).

162 Annie Nova, *How the Affordable Care Act Transformed Our Health-Care System*, CNBC (Dec. 29, 2019, 11:54 AM), https://www.cnbc.com/2019/12/29/how-the-affordable-care-act-transformed-the-us-health-care-system.html [https://perma.cc/4NGT-89ZE].

III. HEALTH & BIOMETRIC PRIVACY

A. *Self-Reporting vs. Healthcare Provider-Reporting*

Contact tracing and exposure notification apps often process solely confirmed diagnoses for the purpose of initiating an exposure notification, but they may also allow for individuals to self-report symptoms.[163] Before switching designs, the United Kingdom's centralized app allowed for self-reporting of symptoms to trigger an exposure notification.[164] The United Kingdom opted for this strategy because the epidemiological model the United Kingdom was relying on demonstrated that any delay in isolating symptomatic individuals has a "real effect on the spread of the virus."[165] If testing is low or slow, then apps designed to process only officially confirmed diagnoses may leave more community spreaders undetected, thereby increasing the occurrence of "false negatives." On the other hand, self-reporting of symptoms can increase the occurrence of "false positives" and over-notification. Malicious or accidental false reports may cause unnecessary anxiety, notification fatigue, and ultimately cause users to lose faith in the efficacy of the system and stop acting on its recommendations.[166] As previously mentioned, SARS-CoV-2 can be transmitted before symptoms are apparent,[167] rendering self-reporting of symptoms itself too slow to control transmission and effectively mooted by asymptomatic carriers.[168]

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163 Ian Levy, *The Security Behind the NHS Contact Tracing App*, NAT'L CYBER SEC. CTR. (May 4, 2020), https://www.ncsc.gov.uk/blog-post/security-behind-nhs-contact-tracing-app [https://perma.cc/S8BM-ACZH]. Apps that rely on self-reporting of symptoms may enable faster notification to others who are at risk of exposure. *Id.* ("The less delay there is, the better the NHS can manage the spread [of SARS-CoV-2].").

164 *Id.*

165 *Id.*

166 LARS BAUMGÄRTNER ET AL., MIND THE GAP: SECURITY & PRIVACY RISKS OF CONTACT TRACING APPS (2020), https://arxiv.org/pdf/2006.05914.pdf [https://perma.cc/https://perma.cc/N74P-DYF]. Allowing self-reporting could also lead to certain security attacks. *Id.* For instance, an attacker could go to a busy place with a Raspberry Pi and an antenna, create fake proximity events, and then self-report themselves as sick, causing everyone in the area to receive a notification. *Id.*

167 Ferretti et al., *supra* note 2, at 1, 6.

168 *Id.* at 6.

In the United States, federal legislation has been introduced that would outlaw self-reporting for exposure notification and contact tracing apps. The bipartisan Exposure Notification Privacy Act (ENPA) would require apps to process only confirmed diagnoses that trigger exposure notifications.[169] This aligns with the Terms of Service for GAEN tools.[170] To implement this in practice, PHAs must deploy a test verification server and a key server to validate positive diagnoses during a key upload (received from a test center or other healthcare provider).[171] Apple has outlined twelve steps involved with verifying and submitting positive diagnoses with Exposure Notification Express.[172]

However, these twelve steps mean there are potentially multiple points of failure by PHAs, health care providers, test centers, individuals, and the system. First, a user with the functionality enabled on their device must get tested for COVID-19. Then, the health care provider or test center determines that the user is positive for SARS-CoV-2 and reports it to the PHA. The PHA then must generate a verification code using the test verification server. This code must be sent to the user, who must enter the code or click the provided link to inform their device of the positive diagnosis. The device subsequently contacts the test verification server to validate the verification code. If valid, a long-term authentication token is sent from the test verification server. The device then creates a hashed message authentication code and sends it to the test verification server along with the authentication token. In return, it receives a certificate and metadata. Next, the device prompts the user for permission to submit their keys to the key server. If the individual grants permission, the data is uploaded to the key server. Finally, if validated by the server,

169 *See* Exposure Notification Privacy Act, S. 3861 § 3(b) 116th Cong. (2020).

170 *See Google COVID-19 Exposure Notifications Service Additional Terms*, GOOGLE (May 4, 2020), https://blog.google/documents/72/Exposure_Notifications_Service_Additional_Terms.pdf [https://perma.cc/37FA-AQPH] [hereinafter GOOGLE, *Exposure Notifications Additional Terms*]; *see also* Apple & Google, *supra* note 54.

171 *Setting Up an Exposure Notifications Express Test Verification Server*, *supra* note 30; *see also Exposure Notifications Verification Server*, GOOGLE API FOR EXPOSURE NOTIFICATIONS, https://developers.google.com/android/exposure-notifications/verification-system#flow-diagram [https://perma.cc/WD48-AV2Q]; *Exposure Notification Reference Key Server*, GITHUB, https://github.com/google/exposure-notifications-server [https://perma.cc/P6RU-AED4].

172 *Supporting Exposure Notifications Express*, *supra* note 29.

the keys are added to the database and become available for other devices to download to be used for on-device exposure detection.[173]

B. *Electronic Protected Health Information*

Fundamentally, the information collected, stored, and shared via contact tracing and exposure notification apps is associated with health information, which suggests that such data may be under the purview of the 1996 Health Insurance Portability and Accountability Act (HIPAA).[174] That contact tracing and exposure notification data may come within the purview of HIPAA protections is supported by both Apple and Google stating that only PHAs can use their system.[175] As the 2009 Health Information Technology for Economic and Clinical Health Act requires, businesses that assist healthcare providers in the sharing of electronic protected health information (e-PHI) (*i.e.*, contact tracing and exposure notification apps), must be compliant with the Privacy and Security Rules of HIPAA.[176] Under HIPAA, the privacy of e-PHI is not only protected, but also subject to security regulations that protect the integrity, confidentiality, and availability/sharing of e-PHI.[177]

Ultimately, the requirement of "self-reporting," or rather opt-in, for these apps nullifies HIPAA's ability to protect user data and dictate the protocols for transmitting, using, storing, and destroying this data.[178] However, many state-level laws supersede HIPAA's guidelines and create a complex labyrinth of regulatory and legislative

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173 *Id.*

174 Health Insurance Portability and Accountability Act (HIPAA) of 1996, Pub. L. No. 104-191, § 262, 110 Stat. 1936, 2021–31 (codified as amended at 42 U.S.C. §§ 1320d–1320d-9); *see also Your Mobile Device and Health Information Privacy and Security*, HEALTHIT.GOV, https://archive.healthit.gov/providers-professionals/your-mobile-device-and-health-information-privacy-and-security [https://perma.cc/8AKS-CRCA].

175 GOOGLE, *Exposure Notifications Terms*, *supra* note 21.

176 Health Information Technology for Economic and Clinical Health (HITECH) Act, Pub. L. No. 111-5, §§ 13401, 13404, 123 Stat. 226, 260, 264 (2009) (codified as amended at 42 U.S.C. §§ 17931, 17934); *see also* 45 C.F.R. § 164.504(e) (2020). The HITECH Act was enacted as part of the American Recovery and Reinvestment Act of 2009. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115.

177 45 C.F.R. § 1644.504; *see also Your Mobile Device and Health Information Privacy and Security*, *supra* note 174.

178 110 Stat. at 2029 (setting forth penalties for individuals who wrongfully disclose individually identifiable health information).

processes that could govern such information.[179] Nevertheless, the HHS and its associated agencies, specifically the CDC and National Institutes of Health (NIH), should be involved in the regulatory processes, particularly for the creation of a nationwide contact tracing initiative, to ensure that health and medical information is adequately protected and aggregated in a secure way that still allows for optimal research efficacy.

The HHS previously lacked a transparent and standardized framework for aggregating and sharing data between its agencies.[180] Accordingly, each agency retained autonomy in interpreting data sharing rules such that data at NIH could follow strict privacy procedures while perhaps the CDC remained more lax.[181] In March 2020, the HHS finalized two rules under the bipartisan 21st Century Cures Act (Cures Act).[182] The Cures Act aims to promote interoperability of ePHI under the first rule, which requires that the United States Core Data for Interoperability standard is used as part of a new API certification criterion for apps.[183]

The second rule under the Cures Act prevents "information blocking" practices, such as anti-competitive behaviors by developers of e-PHI information security.[184] This suggests that the inclusion of the FTC and FCC is critical—the FCC would regulate the transmission of electronic and digital communications, and the FTC would regulate apps acting deceptively or in an unfair manner. Additionally, while the FDA does not regulate devices in public health surveillance, they do provide additional useful guidance on related mobile medical apps that

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179 There are many states that have laws governing the confidentiality of state-held records, including in California, Washington, and Montana. *See* CAL. CIV. CODE § 56.37 (West 2020); WASH. REV. CODE ANN. § 70.02.020 (West 2020); MONT. CODE ANN. § 50-16-525 (West 2020).

180 *See* THE DATA INITIATIVE TEAM, U.S. DEP'T OF HEALTH & HUM. SERVS., THE STATE OF DATA SHARING AT THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES 9 (2018), https://www.hhs.gov/sites/default/files/HHS_StateofDataSharing_0915.pdf [https://perma.cc/3MKQ-DKBF].

181 *See id.*

182 21st Century Cures Act, Pub. L. No. 114-255, 130 Stat. 1033 (2016).

183 *See Cures Act Final Rule: United States Core Data for Interoperability*, HEALTHIT.GOV, https://www.healthit.gov/cures/sites/default/files/cures/2020-03/USCDI.pdf [https://perma.cc/3KS7-Q4GQ].

184 45 C.F.R. § 170.401 (2020).

should be considered.[185] Issues related to access to location data collected by the HHS require additional scrutiny, particularly since HIPAA's Privacy Rule contains exceptions for disclosures to law enforcement.[186]

C. *"Opt-In" and Non-federal Biometric Privacy Regulations*

In contrast to HIPAA, some state laws dictate the protection and transfer of personal data once a user has opted-in, notably Illinois' Biometric Information Privacy Act (BIPA)[187] and California's Consumer Privacy Act (CCPA).[188] Other states have also passed biometric privacy laws,[189] or currently have proposed biometric privacy laws pending,[190] but BIPA particularly includes a private right of action.[191] BIPA also sets forth a comprehensive regulatory framework that could be mirrored in federal regulation, restricting how private entities collect, use, and share biometric information and

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185 *See generally* U.S. FDA, POLICY FOR DEVICE SOFTWARE FUNCTIONS AND MOBILE MEDICAL APPLICATIONS: GUIDANCE FOR INDUSTRY AND FOOD AND DRUG ADMINISTRATION STAFF (2019), https://www.fda.gov/media/80958/download [https://perma.cc/C95L-7YNR]; *see also Digital Health Policies and Public Health Solutions for COVID-19: FDA's Digital Health Policies Allow Innovators to Create COVID-19 Related Public Health Solutions*, U.S. FDA (Mar. 26, 2020), https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/digital-health-policies-and-public-health-solutions-covid-19 [https://perma.cc/FQ9Q-87AF].

186 *See* discussion *infra* Part IV; *see also* 45 C.F.R. § 164.512(f) (2020); PANDURANGA ET AL., *supra* note 16.

187 Biometric Information Privacy Act (BIPA), 2008 Ill. Laws 994 (codified at 740 ILL. COMP. STAT. 14/1−99 (2020)).

188 California Consumer Privacy Act of 2018 (CCPA), 2018 Cal. Stat. ch. 55, § 3 (codified as amended at CAL. CIV. CODE §§ 1798.100−99 (West 2020)).

189 States with biometric privacy laws include Arkansas, California, Illinois, Louisiana, Oregon, Texas, and Washington. ARK. CODE ANN. § 4-110-103(7) (West 2020); CAL. CIV. CODE §§ 1798.100−99; 740 ILL. COMP. STAT. 14/1−99; LA. STAT. ANN. § 51:3073(4)(a)(v) (West 2020); New York (N.Y. GEN. BUS. LAW § 899-bb (McKinney 2020); OR. REV. STAT. ANN. § 646A.602 (West 2020); TEX. BUS. & COM. CODE ANN. § 503.001 (West 2019); WASH. REV. CODE ANN. § 19.375.020 (West 2020).

190 States with currently pending proposed biometric privacy laws include Arizona, Hawaii, and Massachusetts. Other states that have attempted legislation that ultimately died in committee or chamber include Alaska, Delaware, Florida, Michigan, Montana, New Hampshire, New Jersey, and Rhode Island. *See 2020 Consumer Data Privacy Legislation*, NAT'L CONF. OF STATE LEGISLATURES (Oct. 9, 2020), https://www.ncsl.org/research/telecommunications-and-information-technology/2020-consumer-data-privacy-legislation637290470.aspx [https://perma.cc/V5DK-GFVF]; H. 72, 30th Leg., 1st Sess. (Alaska 2017); H. 518, 65th Leg., Reg. Sess. (Mont. 2017) (died in committee); H. 350, 149th Gen. Assemb., 2017–2018 Sess. (Del. 2018).

191 740 ILL. COMP. STAT 14/20.

biometric identifiers under specific security requirements.[192] Biometric identifiers include "retina or iris scan[s], fingerprint[s], voiceprint[s], or scan[s] of hand or face geometry."[193]

On August 4, 2020, Senator Merkley and Senator Sanders introduced the National Biometric Information Privacy Act of 2020 to Congress.[194] The proposal, similar to BIPA, contains a private right of action and a requirement for businesses and employers to obtain the "opt-in" consent of an individual prior to the collection or disclosure of biometric identifiers.[195] The bill also contains a right of access for individuals to know what information a covered entity has collected about them.[196] The bill is supported by various consumer and privacy rights organizations[197] amid growing concerns that non-white individuals are more likely to be misidentified by facial recognition technology.[198]

The risk of inaccurate yet pervasive surveillance enabled through facial recognition technology can have alarming consequences.[199] In this regard, it is striking that digital contact tracing and exposure notification tools are similarly associated with accuracy concerns, surveillance risks, and equity issues. As this Article discusses in Part I, these concerns vary depending on how such apps are designed and

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192 740 ILL. COMP. STAT 14/15.

193 740 ILL. COMP. STAT 14/10.

194 National Biometric Information Privacy Act of 2020, S. 4400, 116th Cong. (2020); Press Release, Sen. Jeff Merkley, Merkley, Sanders Introduce Legislation to Put Strict Limits on Corporate Use of Facial Recognition (Aug. 4, 2020), https://www.merkley.senate.gov/news/press-releases/merkley-sanders-introduce-legislation-to-put-strict-limits-on-corporate-use-of-facial-recognition-2020 [https://perma.cc/FF6W-BHA3].

195 S. 4400, §§ 3−4; Press Release, Sen. Jeff Merkley, *supra* note 194.

196 S. 4400, § 3(f); Press Release, Sen. Jeff Merkley, *supra* note 194.

197 "The bill is supported by Fight for the Future, The American Civil Liberties Union, Electronic Frontier Foundation, and Open Technology Institute." Press Release, Sen. Jeff Merkley, *supra* note 194.

198 *NIST Study Evaluates Effects of Race, Age, Sex on Face Recognition Software: Demographics Study on Face Recognition Algorithms Could Help Improve Future Tools*, NAT'L INST. OF STANDARDS & TECH. (May 18, 2020), https://www.nist.gov/news-events/news/2019/12/nist-study-evaluates-effects-race-age-sex-face-recognition-software [https://perma.cc/THP3-KMBC].

199 Elizabeth McClellan, Note & Comment, *Facial Recognition Technology: Balancing the Benefits and Concerns*, 15 J. BUS. & TECH. L. 363, 374−76 (2020); *see also* Kashmir Hill, *Unmasking a Company That Wants to Unmask Us All*, N.Y. TIMES (Jan. 20, 2020), https://www.nytimes.com/2020/01/20/reader-center/insider-clearview-ai.html [https://perma.cc/AR3N-CN6W].

implemented.[200] Nevertheless, in alignment with BIPA, there is widespread consensus in liberal democracies that contact tracing and exposure notification apps ought to be "opt-in," as demonstrated by the fact that most contact tracing apps are not mandatory.[201] Almost all federal and state contact tracing proposals reflect this despite significant divergences in other areas.[202]

However, in the context of contact tracing and exposure notification apps, the issue of consent is more nuanced than a binary choice between "opt-in" or "mandatory." For instance, different app functionalities[203] should not be bundled together "so that the individual can provide his/her consent specifically for each functionality."[204] Individuals should be provided with granular choices to choose their desired functionalities without being forced to opt in to others, and be provided with the opportunity to provide additional consent if an app is materially changed.[205] Consent could be required at each of the following points: (1) to download an app onto a device; (2) to process the positive diagnosis of a user; and (3) to share personal data with third parties.[206] The E.U. Commission's app guidance states that under the ePrivacy Directive, "storing . . . information on the user's device or gaining access to" stored information is prohibited unless the user provides consent.[207]

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200 *See* discussion *supra* Part I.

201 Aside from a few outliers such as contact tracing apps from Bahrain, Kuwait, and Qatar. *See Bahrain*, *supra* note 57.

202 *See, e.g.*, Public Health Emergency Privacy Act, S. 3749, 116th Cong. § 3(d) (2020) (introduced by Sen. Blumenthal); COVID-19 Consumer Data Protection Act of 2020, S. 3663, 116th Cong. § 3 (2020) (introduced by Sen. Wicker); Exposure Notification Privacy Act, S. 3861, 116th Cong. § 4 (introduced by Sen. Cantwell); Assemb. A10583C, 2019–2020 Legis. Sess. § 2 (N.Y. 2020); *see also State and Territorial Contact Tracing Legislation*, ASS'N OF STATE & TERRITORIAL HEALTH OFFS. (July 2, 2020), https://www.astho.org/COVID-19/State-and-Territorial-Contact-Tracing-Legislation [https://perma.cc/5PM5-LUUQ].

203 In this context, functionalities refers to, inter alia, proximity detection, location tracking, symptom monitoring, COVID-19 research, digital telehealth management, COVID-19 information, or quarantine monitoring and enforcement.

204 Guidance on Apps Supporting the Fight Against COVID 19 Pandemic in Relation to Data Protection, 2020 (C 124 I/01).

205 *Id.*

206 *Id.*

207 *Id.* The ePrivacy Directive provides another exception for when access to the information "is strictly necessary for [a] . . . service . . . explicitly requested . . . by the user." *Id.*

To comply with the ePrivacy Directive, consent is required both to install apps and to place information, such as random identifiers, on devices.[208] Sharing data about individuals who have been diagnosed, or tested positively with interoperable apps from other jurisdictions, "should only be triggered by a voluntary action of the user."[209] However, the EDPB also states that "the mere fact that the use of contact-tracing applications takes place on a voluntary basis does not mean that the processing of personal data will necessarily be based on consent."[210] In Europe, the General Data Protection Regulation (GDPR) provides a legal basis for processing personal data, if processing personal data is necessary for the performance of a task in the public interest.[211] National laws enacted to provide measures allowing for the monitoring of epidemics may also be relied upon if certain requirements are met.[212] However, subjecting an individual to a decision solely based on automated processing, which subsequently produces a legal effect upon the individual, remains prohibited.[213]

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208 *Id.*

209 EDPB, DATA PROTECTION IMPACT, *supra* note 34, at 2.

210 EUR. DATA PROT. BD., GUIDELINES 04/2020 ON THE USE OF LOCATION DATA AND CONTACT TRACING TOOLS IN THE CONTEXT OF THE COVID-19 OUTBREAK 7 (2020), https://edpb.europa.eu/sites/edpb/files/files/file1/edpb_guidelines_20200420_contact_tracing_covid_with_annex_en.pdf [https://perma.cc/Y78M-D7CZ] [hereinafter EDPB, GUIDELINES 04/2020].

211 Council Regulation 2016/679, art. 6(1)(e), 2016 O.J. (L 119) 1.

212 Council Regulation 2016/679, arts. 6(1)(c), 6(3), 9(1)−(2)(i), 2016 O.J. (L 119) 1.

213 The Italian Data Protection Authority has clarified that an exposure alert is an automated decision that has significant consequences for individuals. GARANTE PER LA PROTEZIONE DEI DATI PERSONALI, OPINION ON THE LEGISLATIVE PROPOSAL FOR THE PROVISION OF AN APPLICATION AIMED AT TRACKING COVID-19 INFECTIONS—APRIL 29, 2020 (2020), https://www.garanteprivacy.it/home/docweb/-/docweb-display/docweb/9328050 [https://perma.cc/6ZNP-G8BK]. However, in the final authorization after the Data Protection Impact Assessment (DPIA), there are no specific references to Article 22 of the GDPR (governing automated decision making), but the DPIA does require the algorithm used to be explained. GARANTE PER LA PROTEZIONE DEI DATI PERSONALI, PROVISION OF AUTHORIZATION FOR THE PROCESSING OF PERSONAL DATA CARRIED OUT THROUGH THE COVID 19 ALERT SYSTEM—IMMUNE APP—1 JUNE 2020 (2020), https://www.gpdp.it/web/guest/home/docweb/-/docweb-display/docweb/9356568 [https://perma.cc/U92K-ADJQ].

IV. SECURITY & PRIVACY IMPLICATIONS FOR MOBILE TRACKING DATA

Sociology scholars have long studied the complex relationship between trust and cooperative behaviors.[214] Specifically for COVID-19–related surveillance technologies, researchers have demonstrated a correlation between the willingness to adopt contact tracing apps and their accuracy and privacy standards.[215] However, within the context of data sharing, public trust in information and communication technology providers is strained in light of large-scale data breaches and sales of consumer data to third parties.[216] This skepticism was highlighted in a recent poll that suggested Americans are more likely to trust contact tracing apps offered by public health authorities than Apple and Google, with the majority expressing doubt about whether these companies would protect the privacy of their health data.[217] Additional polling also found that Americans are divided on whether it is acceptable for the government to use cellphones to track people who have tested positively for SARS-CoV-2, with acceptance levels falling in relation to the tracking of people who may have had contact with someone who has tested positive.[218]

Without adequate legislation to safeguard personal information, developers of contact tracing and exposure notification apps face an uphill battle convincing users that sharing their data will only be

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214 Tjeerd-Pieter van Staa et al., *Big Health Data: The Need to Earn Public Trust*, 354 BRIT. MED. J. i3636 (2016).

215 GABRIEL KAPTCHUK ET AL., HOW GOOD IS GOOD ENOUGH FOR COVID19 APPS? THE INFLUENCE OF BENEFITS, ACCURACY, AND PRIVACY ON WILLINGNESS TO ADOPT 8 (2020), https://arxiv.org/pdf/2005.04343.pdf [https://perma.cc/M3LC-M3YZ].

216 Long Cheng, Fang Liu & Danfeng (Daphne) Yao, *Enterprise Data Breach: Causes, Challenges, Prevention, and Future Directions*, WIREs DATA MINING & KNOWLEDGE DISCOVERY, Sept.–Oct. 2017; *see also* Kurt Thomas et al., *Data Breaches, Phishing, or Malware? Understanding the Risks of Stolen Credentials*, *in* CCS '17: PROCEEDINGS OF THE 2017 ACM SIGSAC CONFERENCE ON COMPUTER AND COMMUNICATIONS SECURITY 1421 (2017); LUCY SIMKO ET AL., COVID-19 CONTACT TRACING AND PRIVACY: A LONGITUDINAL STUDY OF PUBLIC OPINION (2020), https://arxiv.org/pdf/2012.01553.pdf [https://perma.cc/9M8U-LGN3]; Dustin Volz, *Yahoo Says Hackers Stole Data From 500 Million Accounts in 2014*, REUTERS (Sept. 22, 2016, 7:27 AM), https://www.reuters.com/article/us-yahoo-cyber/yahoo-says-hackers-stole-data-from-500-million-accounts-in-2014-idUSKCN11S16P [https://perma.cc/5YYL-QGS8].

217 The Wash. Post & Ctr. for Democracy & Civic Engagement, *Washington Post–University of Maryland National Poll, April 21–26, 2020*, WASH. POST (May 21, 2020, 11:26 AM), https://www.washingtonpost.com/context/washington-post-university-of-maryland-national-poll-april-21-26-2020/3583b4e9-66be-4ed6-a457-f6630a550ddf/?itid=lk_inline_manual_3 [https://perma.cc/B2YS-K2HF].

218 Auxier, *supra* note 143.

limited to approved third parties, such as healthcare professionals and public health authorities, and will only be collected, shared, and stored for a limited time. Most crucially, developers will need to reassure prospective users that law enforcement will not have data access. Perhaps the most complicated aspect of digital contact tracing is establishing how current laws could protect user privacy in proximity and location data and other personal information.[219]

A. *Digital Tracking Technologies & U.S. Regulation*

Government surveillance remains a contentious debate in the United States, and privacy advocates have voiced concerns about mission creep, where government entities and private actors could use collected data beyond the scope and timeframe of an app's intended use.[220] Contact tracing data collected in a centralized manner, particularly by private entities, may provide public health authorities with insights about how COVID-19 is spreading, who may be at a higher risk of exposure, and where to allocate resources most effectively and equitably.[221] While the private sector is driving the development of digital tools, both federal and state governments remain interested in influencing their designs and data access standards.[222] Further complicating the issue is the "patchwork" of laws that govern disclosure of collected data, where the constraints on third-party entities are much weaker than those that regulate disclosure for telecommunications carriers.[223]

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219 ORG. FOR ECON. COOP. & DEV., TRACKING AND TRACING COVID: PROTECTING PRIVACY AND DATA WHILE USING APPS AND BIOMETRICS (2020), https://read.oecd-ilibrary.org/view/?ref=129_129655-7db0lu7dto&title=Tracking-and-Tracing-COVID-Protecting-privacy-and-data-while-using [https://perma.cc/8BKQ-CVMW].

220 Guariglia, *supra* note 146.; Palantir Tech., *supra* note 146.

221 Levy, *supra* note 79; *see, e.g.*, *Responding to COVID-19*, PALANTIR, https://www.palantir.com/covid19 [https://perma.cc/67PA-Q5LK]; Thomas Brewster, *Palantir, the $20 Billion, Peter Thiel–Backed Big Data Giant, Is Providing Coronavirus Monitoring to the CDC*, FORBES (Mar. 31, 2020, 5:47 PM), https://www.forbes.com/sites/thomasbrewster/2020/03/31/palantir-the-20-billion-peter-thiel-backed-big-data-giant-is-providing-a-coronavirus-monitoring-tool-to-the-cdc/#7c78f5081595 [https://perma.cc/5TW3-EMCQ].

222 PANDURANGA ET AL., *supra* note 16. Many state laws already apply to contact tracing, such as mini privacy acts and health record confidentiality laws.

223 *Id.* Aside from federal statutes, some states have laws that require government entities to obtain a search warrant before accessing data on an electronic device. *See, e.g.*, Electronic Communications Privacy Act, 2015 Cal. Stat. ch. 651 (codified as amended at CAL. PENAL CODE

In 2018, the U.S. Supreme Court famously held in *Carpenter v. United States*[224] that individuals have a reasonable expectation of privacy in their cell-site location information.[225] *Carpenter* has demonstrably affected the impact of the third-party doctrine, which pertains to the idea under the Fourth Amendment that an individual does not have a reasonable expectation of privacy in information voluntarily turned over to other parties.[226] The case ultimately focused on the nature of the information obtained, rather than the nature of the search by law enforcement.[227]

The Court's ruling requires law enforcement to obtain a warrant to access an individual's historical whereabouts from the records of a cellphone provider and will likely apply to other historically collected geolocation data.[228] *Carpenter* also created the rule of "technological equivalence," whereby the use of a technology may be considered a "search" if it "gives [law enforcement] the power to gather information that is the 'modern-day equivalent' of activity that has been held to be a Fourth Amendment search."[229] With contact tracing and exposure notification apps, the context of location and proximity data could be postulated as comparable to specific geolocation information given the nature of the data and the possibility of third parties gathering information—invoking *Carpenter*'s warrant requirement for gathering cell site location information and adding a layer of protection against open access.[230]

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§§ 1546−1546.2, 1546.4 (West 202)); Electronic Information or Data Privacy Act, 2019 Utah Laws 362 (codified at UTAH CODE ANN. §§ 77-23c-101.1−105 (West 2020)).

224 Carpenter v. United States, 138 S. Ct. 2206 (2018).

225 Paul Ohm, *The Many Revolutions of* Carpenter, 32 HARV. J.L. & TECH. 357, 358, 360 (2019) (heralding *Carpenter* as the most important Fourth Amendment opinion in decades).

226 *See* Orin Kerr & Greg Nojeim, *The Data Question: Should the Third-Party Records Doctrine Be Revisited?*, ABA J. (Aug. 1, 2012, 9:20 AM), http://www.abajournal.com/magazine/article/the_data_question_should_the_third-party_records_doctrine_be_revisited [https://perma.cc/9D2K-ANAT].

227 *Carpenter*, 138 S. Ct. 2206.

228 *Id.*; *see also* Katelyn Ringrose & Divya Ramjee, *Watch Where You Walk: Law Enforcement Surveillance and Protester Privacy*, 11 CALIF. L. REV. ONLINE 349, 355−57 (2020).

229 Ohm, *supra* note 225, at 360.

230 Divya Ramjee & Katelyn Ringrose, *The Challenges of Forensic Genealogy: Dirty Data, Electronic Evidence, and Privacy Concerns*, 98 DENV. L. REV. 157, 183–84 (forthcoming 2021); *see also Carpenter*, 138 S. Ct. 2206. Government collection of data from third-party companies would most likely trigger a Fourth Amendment claim on the grounds of *Katz v. United States*'s "reasonable expectation of privacy." 389 U.S. 347, 360−62 (1967) (Harlan, J., concurring).

While major operating system developers are cautious about third-party access to mobility data, including proximity and location data, a relaxing of such restrictions for the sake of COVID-19 is certainly possible—although generally improbable, due to privacy concerns. Many privacy advocates have stressed the importance of only collecting and sharing data after a user has provided consent or opted in.[231] However, some developers have indicated that they are willing to share infection status, proximity data or location data, and phone contacts with law enforcement in "legally justified cases."[232]

Under the legal frameworks of the Electronic Communications Privacy Act,[233] Stored Communications Act (SCA),[234] and the Telecommunications Act,[235] there is also the possibility for electronic communications associated with a contact tracing or exposure notification app to be accessed by the federal government and law enforcement, even though such data may contain potential health information that would bar access by any entity not "authorized" to access health and medical information.[236] The SCA and Telecommunications Act are most relevant, as they limit third-party companies from voluntarily disclosing either location data or proximity data to law enforcement, regardless of its originating source.[237]

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231 Joel Schectman, Christopher Bing & Jack Stubbs, *Special Report: Cyber-Intel Firms Pitch Governments on Spy Tools to Trace Coronavirus*, REUTERS (Apr. 28, 2020, 1:19 PM), https://www.reuters.com/article/us-health-coronavirus-spy-specialreport/special-report-cyber-intel-firms-pitch-governments-on-spy-tools-to-trace-coronavirus-idUSKCN22A2G1 [https://perma.cc/G5PT-49Z8]; *see also* Foo Yun Chee, *EU Urges Voluntary Use of Virus-Tracing Apps to Speed Recovery from Pandemic*, REUTERS (May 13, 2020, 4:51 AM), https://www.reuters.com/article/us-health-coronavirus-eu-apps/eu-urges-voluntary-use-of-virus-tracing-apps-to-speed-recovery-from-pandemic-idUSKBN22P15H [https://perma.cc/83CG-RETZ].

232 Schectman et al., *supra* note 231.

233 Electronic Communications Privacy Act (ECPA) of 1986, Pub. L. No. 99-508, 100 Stat. 1848, 1848−59 (codified as amended at 18 U.S.C. §§ 2510–23).

234 Stored Communications Act (SCA), Pub. L. No. 99-508, 100 Stat. 1848, 1860−68 (1986) (codified as 18 U.S.C. §§ 2701–12).

235 Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (codified as amended in scattered sections of 47 U.S.C.).

236 Health Insurance Portability and Accountability Act (HIPAA) of 1996, Pub. L. No. 104-191, 110 Stat. 1936 (codified as amended at 42 U.S.C. §§ 1320d–1320d-9); *see also* Ramjee & Ringrose, *supra* note 230, at 187–89.

237 18 U.S.C. § 2702(a); 47 U.S.C. §§ 222(c)(1), (f)(1); *see* PANDURANGA ET AL., *supra* note 16. A potential scenario may involve a third-party company app using a template that provides location or proximity data to the government without user authorization. This information would be protected as "content" or a "record or other information" under the SCA, and if such data is

The Federal Trade Commission Act may also provide protections against third-party companies that violate disclosure agreements, but it may only be enforced by the federal government.[238] It is unlikely that the federal government would enforce such protections given that the federal government would be the one seeking data.[239] The FCC could potentially intervene as well.[240] The FCC could impose a fine similar to the $200 million fine proposed against AT&T, Sprint, T-Mobile, and Verizon for disclosing location data to law enforcement via third-party brokers.[241]

In addition to *Carpenter*, Justice Sotomayor's concurrence in *United States v. Jones* stressed the highly sensitive nature of location data.[242] Utilizing Bluetooth technology does limit geolocation surveillance but proximity data still retains the potential for re-identification—smartphones still broadcast an identifier, though randomized and encrypted in some manner.[243] There is a potential for the government to require the public to download and use contact tracing and exposure notification apps, triggering a Fourth Amendment contest under the *Jones* test even if the app were to use only Bluetooth technology.[244] This type of mandate would also need to survive a challenge bolstered by the Privileges and Immunities Clause,[245] which the Supreme Court, in 1868, interpreted as providing

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stored or processed remotely, the SCA may limit disclosure to the government. *See* 18 U.S.C. § 2702(a); PANDURANGA ET AL., *supra* note 16, at 5, 16 n.45. In contrast, Apple and Google's decentralized proposal is restricted to use by public health authorities, wherein users who opt in to share diagnosis information would be agreeing to share this information with the government. PANDURANGA ET AL., *supra* note 16, at 5. This method involves the sharing of proximity keys, which would be stored locally on a user's device. *Id.*

238 Federal Trade Commission Act of 1914, Pub. L. No. 63-203, 38 Stat. 717 (codified as amended at 15 U.S.C. §§ 41−58); *see also* PANDURANGA ET AL., *supra* note 16, at 2.

239 *See* PANDURANGA ET AL., *supra* note 16, at 2.

240 18 U.S.C. §§ 2701–02; s*ee also* PANDURANGA ET AL., *supra* note 16, at 6, 17 n.66−67.

241 Kim Lyons, *AT&T, Sprint, Verizon, and T-Mobile Will Be Fined More than $200 Million for Selling Customer Locations, Per Report*, VERGE (Feb. 27, 2020, 3:47 PM), https://www.theverge.com/2020/2/27/21156555/verizon-sprint-att-tmobile-fcc-fine-carriers-consumer-data-disclosure [https://perma.cc/BU4P-9DCN]; PANDURANGA ET AL., *supra* note 16, at 6, 17 n.66−67.

242 Carpenter v. United States, 138 S. Ct. 2206 (2018); United States v. Jones, 565 U.S. 400, 415 (2012) (Sotomayor, J., concurring).

243 LEITH & FARRELL, *supra* note 66; *see also* Newton, *supra* note 66.

244 Rozenshtein, *supra* note 148; *see also Jones*, 565 U.S. at 404−08 (majority opinion).

245 U.S. CONST. art. IV, § 2, cl. 1.

a fundamental right to freedom of movement.[246] With digital contact tracing and exposure notification requiring surveillance of all individuals, not just those who test positive for SARS-CoV-2, the constitutionality of contact tracing and exposure notification would rely on analysis of the Fourth Amendment's special needs doctrine[247] and raise concerns similar to those involved with the USA PATRIOT Act.[248]

B. *Accountability Measures*

Much of the discussion regarding contact tracing and exposure notification apps has not adequately addressed requirements for public engagement at a level that would optimize epidemiological value.[249] Adoption of beneficial public health measures and behaviors depends on a number of factors, especially public understanding of the potential benefits for themselves[250] and their community.[251] Previous studies have demonstrated the utility of digital contact tracing initiatives, albeit not at the scale necessary to mitigate the spread of COVID-19, in controlling infection spread.[252]

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246 Paul v. Virginia, 75 U.S. 168, 170−71, 180 (1868) (defining freedom of movement as "the right of free ingress into other States, and egress from them").

247 Ferguson v. City of Charleston, 532 U.S. 67 (2001).

248 Rozenshtein, *supra* note 148 (noting that constitutional concerns may arise that are similar to those raised regarding "the National Security Agency's telephony metadata program under Section 215 of the USA Patriot Act").

249 To promote an inclusive digital public health response, a proposal put forth by medical and public health experts at the Johns Hopkins Berman Institute of Bioethics and Johns Hopkins Center for Health Security is for digital public health responses to reflect the range of values that are important to individuals, or what they refer to as "values in design." JOHNS HOPKINS PROJECT, *supra* note 52, at 10. The Hopkins group notes that these "values may include privacy, but also autonomy, efficiency, equity, or others" and that "[t]echnology design should reflect an appropriate balance and prioritization of identified values." *Id.*

250 Grace Shin et al., *Wearable Activity Trackers, Accuracy, Adoption, Acceptance and Health Impact: A Systematic Literature Review*, 93 J. BIOMEDICAL INFORMATICS 103153 (2019); *see also* Johannes Brug et al., *SARS Risk Perception, Knowledge, Precautions, and Information Sources, the Netherlands*, 10 EMERGING INFECTIOUS DISEASES 1486 (2004).

251 Atika Qazi et al., *Analyzing Situational Awareness Through Public Opinion to Predict Adoption of Social Distancing Amid Pandemic COVID-19*, 92 J. MED. VIROLOGY 849 (2020).

252 Lisa O. Danquah et al., *Use of a Mobile Application for Ebola Contact Tracing and Monitoring in Northern Sierra Leone: A Proof-of-Concept Study*, 19 BMC INFECTIOUS DISEASES 810 (2019); *see also* Mark Zastrow, *Coronavirus Contact-Tracing Apps: Can They Slow the Spread of COVID-19?*, NATURE (May 19, 2020), https://www.nature.com/articles/d41586-020-01514-2 [https://perma.cc/C56E-8MNC].

Public trust is a central piece of the puzzle when implementing contact tracing and exposure notification apps. Not only do privacy laws need to be concisely explained to potential users when opting in, but there also needs to be some level of guarantee that all aspects of the system protect internal data and protect from unauthorized external access. Absent meaningful safeguards, the public remains concerned that the collected data may be misappropriated, potentially even being used for targeting and infringing on civil liberties.[253] Additionally, the public needs to believe that companies are being genuinely forthright with the limitations of their technologies[254]—realizing that these apps should not be marketed as some sort of mandated scientific tool but rather a mechanism to improve individual health while simultaneously improving public health and the greater good.[255]

Google and Apple stipulate a number of terms for public health authorities to abide by in order to use the GAEN API.[256] Nevertheless, this still opens the field to multiple companies, with varying standards of data privacy policies, to be responsible for appropriately harvesting relevant SARS-CoV-2 and COVID-19 information without compromising people's personal data and related metadata.[257] Clear guidelines could provide as to how Google and Apple should develop and update their APIs to ensure appropriate protections for location and health information. Additionally, such guidelines must be established that simplify the sharing of personal data and potential electronic health information for pandemic response at the state and federal levels while still preserving and upholding privacy rights.

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253 PANDURANGA ET AL., *supra* note 16, at 1.

254 *See generally* Baobao Zhang et al., *Americans' Perceptions of Privacy and Surveillance in the COVID-19 Pandemic*, OSF PREPRINTS, Dec. 8, 2020, https://osf.io/9wz3y [https://perma.cc/QF2G-8UGA].

255 Alia E. Dastagir, *Some People Listen to Health Experts, Others Ignore Them: What It Means for America's Future with COVID-19*, USA TODAY (Aug. 17, 2020, 6:22 AM), https://www.usatoday.com/story/news/health/2020/08/15/coronavirus-restrictions-why-americans-dont-follow-rules-wear-face-masks/3368667001 [https://perma.cc/8F4E-54WK].

256 *See* GOOGLE, *Exposure Notifications Additional Terms*, *supra* note 170.

257 Trusting private sector entities with valuable data, including mobility data (and potentially social media and search data) poses another issue that should be discussed during policy development—antitrust. By prioritizing solutions offered by major tech players, such as Google, Apple, Facebook, or Microsoft, the U.S. government would effectively be further entrenching their statuses as tech leviathans by implicitly discouraging others from entering the market, as new technologies and new companies will have neither the market share nor the technological infrastructure to support a robust contact tracing system.

Transparency about data practices is a fundamental trust-based incentive to promote responsible data use.[258] Providing detailed Data Protection Impact Assessments,[259] as required by the GDPR, and making source code available for public scrutiny improves the ability for scientific experts, privacy watchdogs, and regulators to promote accountability.[260] For instance, both Germany and Ireland have opted to make their source code public,[261] an approach encouraged by EU institutions.[262] External oversight and consequences for misuse and abuse are also crucial elements of accountability. Guidance from the EU Commission states that EU "Data Protection Authorities should be fully involved and consulted in the context of the development of the app and they should keep its deployment under review."[263] Due to the nascence of the deployment of digital tools for contact tracing, continuous performance monitoring and auditing of the app functionality is also important to assess accuracy and effectiveness over time.[264] In particular, unforeseen results, such as disparate impact, should be proactively identified and mitigated in an ongoing manner.

Safeguarding an individual's general personal data has always been a challenge in contact tracing,[265] now potentially more complicated with the proliferation of automated processing and the

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258 IDAC, *supra* note 6.

259 *See, e.g.*, *COVID Alert: COVID-19 Exposure Notification Application Privacy Assessment*, GOV'T OF CAN. (Oct. 2020), https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19/covid-alert/privacy-policy/assessment.html [https://perma.cc/3S87-2TK2]; FED. REPUBLIC OF GER., CORONA WARN APP: BERICHT ZUR DATENSCHUTZ-FOLGENABSCHÄTZUNG FÜR DIE CORONA-WARN-APP [DATA PROTECTION IMPACT ASSESSMENT REPORT FOR THE CORONA WARN APP] (2020), https://www.coronawarn.app/assets/documents/cwa-datenschutz-folgenabschaetzung.pdf [https://perma.cc/M9JN-9HN7].

260 EDPB, GUIDELINES 04/2020, *supra* note 210, at 8 (advising that "source code should be made publicly available for the widest possible scrutiny"); *see also* FINCH ET AL., *supra* note 128.

261 Jee, *supra* note 158.

262 Resolution on EU Coordinated Action to Combat the COVID-19 Pandemic and Its Consequences, EUR. PARL. DOC. P9_TA-PROV(2020)0054 (2020).

263 Commission Guidance on Apps Supporting the Fight Against COVID 19 Pandemic in Relation to Data Protection, 2020 O.J. (C 124I) 9.

264 EDPB, GUIDELINES 04/2020, *supra* note 210.

265 MOLLY BODE ET AL., MCKINSEY & CO., CONTACT TRACING FOR COVID-19: NEW CONSIDERATIONS FOR ITS PRACTICAL APPLICATION (2020), https://www.mckinsey.com/~/media/McKinsey/Industries/Public%20and%20Social%20Sector/Our%20Insights/Contact%20tracing%20for%20COVID%2019%20New%20considerations%20for%20its%20practical%20application/Contact-tracing-for-covid-19-new-considerations-May-2020.pdf [https://perma.cc/FC3F-QUVY].

collection of unique digital identifiers. Consumers need to believe that the level of anonymization used for personal data is sufficient for maintaining privacy and that their data will not be used in ways that may harm them.[266] Studies have already demonstrated that despite the removal of personal-identifying data and generating randomized IDs, it may still be possible to determine identities in large medical datasets.[267] Along with potentially being personally identified, there is also concern that the centralized contact tracing-generated social graphs[268] may also reveal identifying information about known associates.[269] The American Civil Liberties Union (ACLU) released guidelines stressing that users should not be forced to use an app by the U.S. government, an employer, or a school, and there should also be protections to prevent abuse of social graphs by such entities.[270]

V. PROPOSED REGULATION

Consistent, concise, and evidence-based communications from trusted sources, including public health officials and other scientific authorities, are likely to be especially important to promote the adoption of contact tracing or exposure notification apps.[271] However,

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266 *See generally* Monica Anderson & Brooke Auxier, *Most Americans Don't Think Cellphone Tracking Will Help Limit COVID-19, Are Divided on Whether It's Acceptable*, PEW RSCH. CTR. (Apr. 16, 2020), https://www.pewresearch.org/fact-tank/2020/04/16/most-americans-dont-think-cellphone-tracking-will-help-limit-covid-19-are-divided-on-whether-its-acceptable [https://perma.cc/DNA5-APBP].

267 Rocher et al., *supra* note 64, at 2.

268 A social graph is a graph that displays the interconnected relationships in a user's social network. *See* Boonsri Dickinson, *So What the Heck Is the 'Social Graph' Facebook Keeps Talking About?*, BUS. INSIDER (Mar. 2, 2012, 8:10 PM), https://www.businessinsider.com/explainer-what-exactly-is-the-social-graph-2012-3 [https://perma.cc/QPY3-M5DH]; Max I. Fiest, Note, *Why a Data Disclosure Law Is (Likely) Unconstitutional*, 43 COLUM. J.L. & ARTS 517, 556–17 (2020).

269 BODE ET AL., *supra* note 265.

270 DANIEL KAHN GILLMOR, ACLU, PRINCIPLES FOR TECHNOLOGY-ASSISTED CONTACT-TRACING (2020), https://www.aclu.org/sites/default/files/field_document/aclu_white_paper_-_contact_tracing_principles.pdf [https://perma.cc/98UY-BAPP].

271 Hui Wang et al., *Communicating in a Public Health Crisis*, 2 LANCET DIGIT. HEALTH E503, E503 (2020), https://www.thelancet.com/journals/landig/article/PIIS2589-7500(20)30197-7/fulltext [https://perma.cc/L925-747J]; *see also Digital Contact Tracing Tools*, CTRS. FOR DISEASE CONTROL & PREVENTION (May 26, 2020), https://www.cdc.gov/coronavirus/2019-ncov/php/contact-tracing/contact-tracing-plan/digital-contact-tracing-tools.html [https://perma.cc/26RZ-GM6H] (stating that "[s]ocial mobilization and mass marketing media campaigns are required to gain a critical mass behind one or more application[s] for broad public usage"); JOHNS HOPKINS PROJECT, *supra* note 52, at 7; Holder, *supra* note 159.

fragmentation of app design and deployment at the state level has heightened confusion in the United States, and public messaging has generally been inconsistent around this topic.[272] For instance, in the wake of overwhelming protests following the murder of George Floyd, the Commissioner of Minnesota's Department of Public Safety publicly stated that law enforcement was conducting "contact tracing."[273] This false conflation between contact tracing in the context of public health and standard law enforcement investigations may potentially undermine public health efforts and reduce the willingness of individuals to participate in contact tracing, especially in marginalized communities that are often subjected to over-policing.[274] Accordingly, Congress and several state legislatures have proposed legislation that would impose strict purpose, retention, and sharing limitations on data collected for contact tracing and exposure notification purposes, and to prevent law enforcement and immigration authorities from accessing or using contact tracing and exposure notification information.[275]

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272 Ashkan Soltani, Ryan Calo & Carl Bergstrom, *Contact-Tracing Apps Are Not a Solution to the COVID-19 Crisis*, BROOKINGS INST. (Apr. 27, 2020), https://www.brookings.edu/techstream/inaccurate-and-insecure-why-contact-tracing-apps-could-be-a-disaster [https://perma.cc/ZNT7-BESL]; *see also* Thomas Germain, *How to Protect Phone Privacy and Security During a Protest*, CONSUMER REPS. (June 3, 2020), https://www.consumerreports.org/privacy/protect-phone-privacy-security-during-a-protest [https://perma.cc/XD94-857Q] (providing a number of recommendations to protesters, such as to disable location tracking (GPS, Bluetooth, WiFi), to turn on airplane mode, to turn phone off, and/or to use a burner phone).

273 Sara Morrison, *Minnesota Law Enforcement Isn't "Contact Tracing" Protesters, Despite an Official's Comment*, VOX (June 1, 2020, 7:17 PM), https://www.vox.com/recode/2020/6/1/21277393/minnesota-protesters-contact-tracing-covid-19 [https://perma.cc/K3XT-JE8X].

274 *See generally* Tom R. Tyler & Cheryl J. Wakslak, *Profiling and Police Legitimacy: Procedural Justice, Attributions of Motive, and Acceptance of Police Authority*, 42 CRIMINOLOGY 253, 276 (2004) (discussing the negative reactions people experience as a result "of profiling, regardless of whether they have experienced it or believe that it generally occurs in their neighborhood and city"); *see also* Patricia Y. Warren, *The Continuing Significance of Race: An Analysis Across Two Levels of Policing*, 91 SOC. SCI. Q. 1025, 1025, 1027–30 (2010) (discussing the "significant race variation in perceptions of the police, with [B]lack citizens holding lower levels of trust than do whites . . . because they frequently perceive police as unjust and racially biased").

275 Exposure Notification Privacy Act, S. 3861, 116th Cong § 8 (2020) (introduced by Senators Cantwell and Cassidy on June 1, 2020); COVID-19 Consumer Data Protection Act of 2020, S. 3663, 116th Cong. (2020) (introduced by Senator Wicker on May 7, 2020); Public Health Emergency Privacy Act, S. 3749, 116th Cong. (2020) (introduced by Senator Blumenthal on May 14, 2020); Assemb. A10500C, 2019–2020 Legis. Sess. (N.Y. 2020) (introduced by Assembly Member Richard Gottfried) (relating to the confidentiality of contact tracing information); Assemb. 660, 2019–2020 Legis. Reg. Sess. (Cal. 2020) (introduced by Assembly Member Marc Levine).

Manual contact tracing efforts are clearly no match for the current scale of the pandemic, and many contact tracers rapidly hired remain inadequately trained to perform case investigation, a function that the CDC has referred to as a "specialized skill."[276] Thus far, public engagement with manual contact tracers has also been disappointing.[277] In an attempt to earn trust, New York enacted a law requiring COVID-19 contact tracers to be "representative of the cultural and linguistic diversity of the communities in which they serve."[278] As outlined above in Parts II and III, there are a number of federal regulatory agencies, along with the U.S. Congress, that can establish federal-level privacy and security standards, as well as mandates for contact tracing app adoption amongst the public. It would be feasible to establish a federal network, and considering that waves of COVID-19 are expected to continue well into 2021, now would be the time for the federal government to take a proactive stance.

Regulatory powers need to take initiative and provide concise guidance on public health surveillance, perhaps involving the creation of a public health oversight body that is independent from political or corporate interests. Forthcoming research additionally suggests that the issue of contact tracing is not necessarily ideological or has not yet been politicized, creating opportunities for bipartisan elite to mobilize constituents to opt in.[279] This means there is potential for a comprehensive national strategy with bipartisan backing that would encourage the general public to voluntarily participate in digital contact tracing initiatives. For instance, Senator Warren introduced legislation for a national contact tracing program, calling for it to be included in a future pandemic response package that Congress passes.[280] Supported by many Democratic co-sponsors, the

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276 CDC, CASE INVESTIGATION AND CONTACT TRACING, *supra* note 1 (stating that manual contact tracers require "training, supervision, and access to social and medical support for patients and contacts").

277 *See, e.g.*, Holder, *supra* note 159 (describing interactions a Florida contact tracer has experienced).

278 2020 N.Y. Sess. Laws 115 (McKinney).

279 Zhang et al., *supra* note 254.

280 Coronavirus Containment Corps Act, S. 3848, 116th Cong. § 2 (2020) (introduced by Senator Warren); *see also* Press Release, Sen. Elizabeth Warren, Warren, Levin, Merkley, Smith Introduce Legislation for a National Contact Tracing Program (May 14, 2020), https://

Coronavirus Containment Corps Act would require the CDC to develop a national contact tracing strategy and create privacy protections relating to manual contact tracing and digital tools.[281] Senator Schatz has also introduced legislation that would require the CDC to establish a national plan for contact tracing and testing.[282]

In April 2020, FTC Commissioner Christine Wilson expressed her views on "Privacy in the Time of COVID-19."[283] In the past, Commissioner Wilson has called for Congress to enact comprehensive federal privacy legislation.[284] However, in the midst of the public health crisis, Commissioner Wilson acknowledged that legislators are focused on enacting urgent emergency response measures and called for governments to follow the principles of necessity and proportionality in making demands or requests for data sharing from private companies during the public health emergency.[285] The FTC should establish rules and accountability measures for digital contact tracing and exposure notification tools for technology and communication companies. Thus far, the FTC has not been forced to create protective measures for consumers, despite the blatant necessity.[286]

The proposed COVID-19 Consumer Data Protection Act of 2020, introduced by leading Senate Republicans to regulate COVID-19–

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www.warren.senate.gov/newsroom/press-releases/warren-levin-merkley-smith-introduce-legislation-for-a-national-contact-tracing-program [https://perma.cc/3YGU-7N2N].

281 S. 3848; Press Release, Sen. Elizabeth Warren, *supra* note 280.

282 Jobs to Fight COVID-19 Act of 2020, S. 3828, 116th Cong. (2020).

283 Christine Wilson, *Privacy in the Time of COVID-19*, TRUTH ON THE MKT. (Apr. 15, 2020), https://truthonthemarket.com/2020/04/15/privacy-in-the-time-of-covid-19 [https://perma.cc/7DR8-WMN4].

284 Christine S. Wilson, Comm'r, FTC, Remarks at the Future of Privacy Forum: A Defining Moment for Privacy: The Time Is Ripe for Federal Privacy Legislation (Feb. 6, 2020), at 13, https://www.ftc.gov/system/files/documents/public_statements/1566337/commissioner_wilson_privacy_forum_speech_02-06-2020.pdf [https://perma.cc/U2TD-4LJD] (stating that the Commissioner called to address emerging regulatory gaps; to provide consumers with clarity about "how their data is [sic] collected, used, and shared"; and to promote predictability and certainty for businesses).

285 Wilson, *supra* note 283.

286 On August 5, 2020, the Senate Committee on Commerce, Science, and Transportation convened a hearing titled "Oversight of the Federal Trade Commission." *Oversight of the Federal Trade Commission*: *Hearing Before the S. Comm. on Com., Sci., & Transp.*, 116th Cong. (2020) (statement of Joseph J. Simons, Chairman, FTC). At the hearing, Chairman Joseph J. Simons called for more authority for the FTC, specifically requesting "(1) the ability to seek civil penalties, (2) jurisdiction over non-profits and common carriers, and (3) targeted Administrative Procedure Act ("APA") rulemaking authority to ensure the law keeps pace with changes in technology and the market." *Id.* at 2.

related data, neither provides additional resources for the FTC to create enforcement mechanisms for consumer privacy protections nor advocates for any other rule-making authority.[287] It would, however, require the FTC to "issue guidelines recommending best practices for covered entities to minimize the collection, processing, and transfer of covered data."[288] In contrast, the Public Health Emergency Privacy Act, introduced more recently by leading Senate Democrats, does advocate for the FTC, as well as HHS, to participate in regulatory capacities for a broad range of covered entities, including contact tracing apps, that handle and process COVID-19 consumer data.[289]

These two federal bills were introduced to regulate data collected, used, and shared for COVID-19–related purposes, *i.e.*, emergency health data, and include voluntary adoption and user consent as key components.[290] Both bills contain provisions requiring individual consent and would prohibit covered entities from using emergency health data for purposes unrelated to responding to COVID-19.[291] However, despite many substantive similarities between the two proposals, significant differences remain in terms of enforcement mechanisms, preservation of existing state laws, anti-discrimination, research exemptions, and scope.[292] These are familiar areas of debate regarding comprehensive federal privacy legislation.[293] Due to partisan divides, it is unlikely that either of these proposals will be enacted.

It is therefore notable that the ENPA has bipartisan support to create strong legal safeguards for users whose personal data are

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287 COVID-19 Consumer Data Protection Act of 2020, S. 3663, 116th Cong. (2020) (introduced by Senator Wicker on May 7, 2020).

288 *Id.* at § 3(g)(2).

289 Public Health Emergency Privacy Act, S. 3749, 116th Cong. (2020) (introduced by Senator Blumenthal on May 14, 2020).

290 S. 3363, § 3; S. 3749, §§ 2–3.

291 S. 3363, § 3; S. 3749, §§ 2–3.

292 Pollyanna Sanderson, Stacey Gray & Katelyn Ringrose, *Newly Released COVID-19 Privacy Bills Would Regulate Pandemic-Related Data,* FUTURE OF PRIV. F. (Dec. 17, 2020), https://fpf.org/2020/05/15/newly-released-covid-19-privacy-bills-would-regulate-pandemic-related-data [https://perma.cc/UFW9-NG3P].

293 *See, e.g.*, Maureen K. Ohlhausen, Matthew R. Baker & Jonathon J. Duzak-Forestier, *A Once and Future Federal Privacy Law?*, ANTITRUST SOURCE, Apr. 2020, https://www.privacysecurityacademy.com/wp-content/uploads/2020/05/Once-Future-Federal-Privacy-Law-final.pdf [https://perma.cc/9JLT-NCFQ].

collected by private entities through "automated exposure notification services," *i.e.*, contact tracing apps and exposure notification apps.[294] Many provisions of this narrower bill align with longstanding privacy principles, as well as the requirements for apps contained in GAEN's Terms.[295] However, unlike the Terms,[296] the ENPA would apply more broadly to all contact tracing and exposure notification apps.[297] In addition to requiring consent, the bill contains numerous provisions to guard against mission creep.[298] App operators would also be prohibited from using data for commercial purposes or transferring data to executive agencies for secondary purposes (such as law or immigration enforcement).[299]

To promote accountability and oversight, the ENPA includes a provision that would extend the purview of the Privacy and Civil Liberties Oversight Board (PCLOB) to federally declared public health emergencies.[300] Currently, the PCLOB is responsible for ensuring that federal counterterrorism actions appropriately safeguard privacy and civil liberties.[301] The ENPA also features a strong anti-discrimination provision[302] and would require contact tracing and exposure notification apps to process only "authorized diagnos[es]," and app operators would be required to "collaborate with a public health authority."[303] To comply with this provision, more guidance is likely necessary to determine the extent to which private entities (such as employers) would need to collaborate with public health authorities.

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294 *See* Exposure Notification Privacy Act, S. 3861 § 3 116th Cong. (2020).

295 GOOGLE, *Exposure Notifications Additional Terms*, *supra* note 170.

296 GOOGLE, *Exposure Notifications Terms*, *supra* note 21.

297 S. 3861.

298 *Id.* App operators would be prohibited from collecting or processing data beyond the "minimum amount necessary to implement an automated exposure notification service for public health purposes" related to COVID-19. *Id.* at § 5(a)(1).

299 *See* S. 3861.

300 *Id.* § 9(b).

301 *History and Mission*, U.S. PRIV. & C.L. OVERSIGHT BD., https://www.pclob.gov/About/HistoryMission [https://perma.cc/4D39-YH6B].

302 S. 3861, § 8. The ENPA's anti-discrimination provision would apply to restaurants, educational institutions, hotels, retailers, and other places of "public accommodation" (as defined in Section 301 of the Americans With Disabilities Act). *Id.* If passed, the bill would make it unlawful for these kinds of establishments to use data from automated exposure notification services to deny people entry, services, or otherwise discriminate against them. *Id.*

303 *Id.* §§ 2(3), 3(a)−(b), 4(a)(2).

Depending on how the anti-discrimination provision is interpreted, employers could be precluded from implementing contact tracing and exposure notification apps in the workplace.[304] In contrast, the provision could be interpreted to mean that a developer of an enterprise solution or an employer must seek guidance, input, or approval from a public health authority. In this way, the provision could promote the legitimacy of enterprise contact tracing solutions by ensuring that they are designed and implemented to support the work of public health authorities. However, due to significant legal and contextual differences, a more practicable alternative solution may be to create separate regulatory frameworks for consumer-based apps and employer-based apps.

Although none of these federal proposals are likely to pass in the near future, they contain many similar elements to various state-level proposals that have considerable support. For instance, the New York State Senate and Assembly passed a bill intended to protect the confidentiality of contact tracing information and prohibit law and immigration enforcement from accessing the information.[305] In August 2020, the California legislature almost passed a similar bill, which would have required that data collected for the purpose of contact tracing be used, maintained, or disclosed only to facilitate contact tracing efforts, and would have prohibited law enforcement from participating in contact tracing.[306] Legislative analysis of the bill states that effective contact tracing depends on the availability of complete data, which in turn depends on the participation and openness of individuals who trust that their data will not be misused.[307]

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304 For instance, the app "Check-In" is suggested for use by employers, and its website states that the app is "[m]ost effective when mandated for employees located within company property, or geofence." *Check-In: A PwC Product*, PWC, https://www.pwc.com/us/en/products/check-in.html?WT.mc_id=CT3-PL300-DM1-TR1-LS4-ND30-PR1-CN_CheckIn-Checkin&eq=CT3-PL300-DM1-CN_CheckIn-Checkin&gclid=EAIaIQobChMIu6GUh-ns6wIVUpJbCh0SvwVIEAAYASAAEgIVkPD_Bw [https://perma.cc/K9JM-PNNG].

305 Assemb. A10500C, 2019–2020 Legis. Sess. (N.Y. 2020) (introduced by Assembly Member Richard Gottfried) (relating to the confidentiality of contact tracing information); S. S8450C, 2019–2020 Legis. Sess. (N.Y. 2020) (introduced by State Senator Gustavo Rivera).

306 Assemb. 660, 2019–2020 Legis. Reg. Sess. (Cal. 2020) (introduced by Assembly Member Marc Levine).

307 PERSONAL INFORMATION: CONTACT TRACING, Assemb. 660, S. Judiciary Comm., 2019–2020 Legis. Reg. Sess. (Cal. 2020), https://sjud.senate.ca.gov/sites/sjud.senate.ca.gov/files/ab_660_levine_senate_judiciary_committee_analysis.pdf [https://perma.cc/DA7U-Q6BB]. The legislative analysis observes that individuals are concerned about the potential misuse of their data,

The ACLU, and many other privacy and consumer advocacy organizations, supports these bills.[308]

Aiming to promote trust more broadly in collection, use, and sharing of data to mitigate the spread of COVID-19, another New York bill contains transparency requirements, data minimization obligations, retention limitations, and data security obligations for government entities and third-party recipients of emergency health data.[309] On July 30, 2020, the New Jersey Assembly passed similar, but narrower legislation, which would require public health authorities and "third part[ies]" to abide by purpose and retention limitations for contact tracing data.[310] California almost passed a similar bill.[311] However, opponents argued that it put privacy before public health, and that the anti-discrimination provisions would deny covered entities the ability to mitigate health risks to consumers and employees posed by other individuals.[312]

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and that effective regulation can make individuals more likely to download a contact tracing app, share information about their contacts, and change their behavior. *Id.* at 6–7.

> [T]he process is undermined and trust is broken if that data can be used for other purposes or combined with other data. For example, it is arguably a problematic practice, and a breach of a user's reasonable expectations, to allow such information to be used for other business purposes, such as profiling consumers or marketing to them, or for the information to be provided to other public entities, including federal authorities, for any purposes other than stemming the spread of a communicable disease.

Id. at 8. Public health is about building trust. It is essential to stop misuse while encouraging positive use of data.

308 Press Release, American Civil Liberties Union, Civil Rights Groups, Health Advocates and Public Defenders Celebrate Passage of Legislation to Protect Contact Tracing Data from Law Enforcement: Amid Dual Crises of Covid-19 Pandemic & Police Abuse, Advocates Call For Governor Cuomo to Sign the Bill Immediately (July 23, 2020), https://www.aclu.org/press-releases/civil-rights-groups-health-advocates-and-public-defenders-celebrate-passage [https://perma.cc/9JMA-2RQN].

309 S. S8448D, 2019–2020 Legis. Sess. (N.Y. 2020) (introduced by State Senator Kevin Thomas on June 3, 2020) ("Relates to requirements for the collection and use of emergency health data and personal information and the use of technology to aid during COVID-19.").

310 Assemb. 4170, 219th Leg. (N.J. 2020). The New Jersey Senate received the bill on August 3, 2020. *Id.* It was then referred to the Senate Health, Human Services and Senior Citizens Committee. *Id.*

311 Technology-Assisted Contact Tracing Public Accountability and Consent Terms (TACT-PACT) Act, Assemb. 1782, 2019–2020 Legis. Reg. Sess. (Cal. 2020). This bill would have comprehensively regulated digital contact tracing tools, called "technology-assisted contact tracing," offered by public health entities and businesses. *Id.* The bill would also have prohibited discrimination based on participation in technology-assisted contact tracing. *Id.*

312 *Hearing on Assemb. 1782 Before the S. Judiciary Comm.*, 2019–2020 Legis. Reg. Sess. (Cal. 2020) (testimony of Shoeb Mohammed, Policy Advocate, CalChamber & Laura Curtis, Senior Director of State Affairs for California and Hawaii, CompTIA).

On January 14, 2021, the Washington Privacy Act of 2021 (WPA) had its first Public hearing in the Washington State Senate Committee on Environment, Energy & Technology.[313] The Washington State Legislature considered two previous iterations of the comprehensive data privacy legislation, but both narrowly failed to pass into law.[314] This year, the WPA contains sections to specifically regulate uses of "geolocation data, proximity data, or personal health data" for detecting COVID-19 symptoms, enabling automated contact tracing, or identifying outbreak hotspots.[315] Private and public sector entities would be regulated, including institutions of higher education.[316] The bill also contains individual consent requirements and creates various individual rights (access, correction, deletion, and processing opt out).[317] It also contains various responsibilities and restrictions for data handlers, such as purpose specification, data minimization, data retention limitation, confidentiality, security, and transparency.[318] Finally, the WPA would prohibit entities from disclosing covered data to law enforcement, selling the data, and sharing it in the absence of a contract.[319]

Unless appropriate guardrails are put in place, data collected by governments through contact tracing and exposure notification tools and apps could be used in unexpected, inappropriate, or even harmful ways.[320] This issue has frequently been cited as a factor undermining the willingness of individuals to participate in contact tracing,

313 Washington Privacy Act, S. 5062, 67th Leg., Reg. Sess. (Wash. 2021); *see SB 5062—2021–22: Bill History*, WASH. STATE LEGISLATURE, https://app.leg.wa.gov/billsummary?BillNumber=5062&Year=2021&Initiative=False [https://perma.cc/M2V3-5C7A].

314 Khari Johnson, *Washington Privacy Act Fails Again, but State Legislature Passed Facial Recognition Regulation*, VENTUREBEAT: MACHINE (Mar. 12, 2020, 6:09 PM), https://venturebeat.com/2020/03/12/washington-privacy-act-fails-in-state-legislature-again [https://perma.cc/N5CF-PESJ]; Rick Morgan, *State Lawmakers Take Another Crack at Protecting Consumer Data Privacy*, PUGET SOUND BUS. J. (Jan. 20, 2021, 6:16 PM), https://www.bizjournals.com/seattle/news/2021/01/20/wpa-wtia-state-legislature.html [https://perma.cc/97ZC-9GNZ].

315 S. 5062 § 201(7).

316 *Id.* §§ 201(6), 301(2).

317 *Id.* §§ 202(1)(b), 203.

318 *Id.* § 207.

319 *Id.* § 202.

320 *See supra* Part IV.

particularly among over-policed and undocumented communities.[321] As previously outlined in Part I, contact tracing apps designed in a decentralized manner adopt a privacy-by-design[322] approach, effectively cutting government entities and tech companies out of the loop, matching the user ID on each mobile device rather than in a centralized server. "Privacy-by-design" is a deliberate and systematic approach to privacy and data security, whereby privacy and security is built in to the design of products and services from the outset.[323] It has been advocated for by the FTC,[324] as well as overseas in Europe.[325]

In the absence of adequate legal regulation in the United States to promote public trust and to prevent inappropriate data sharing or usage, technology providers have been left with little choice but to build in these essential regulatory protections by design,[326] inevitably making functionality and usability tradeoffs. Adequate legal regulation in this space could create new avenues for greater technological creativity and functionality. This would allow for the collection and use of digital contact tracing and exposure notification data by PHAs to improve calculations about the accuracy of alert notifications, to enable PHAs to suppress notifications in "edge cases" when risk of inferential identification is high, to identify outbreak hotspots, and to use for COVID-19 research purposes. It is evident that there is an urgent need for comprehensive federal privacy legislation to promote public trust and adoption of socially beneficial digital

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321 *See* PERSONAL INFORMATION: CONTACT TRACING, Assemb. 660, S. Judiciary Comm., 2019–2020 Legis. Reg. Sess. (Cal. 2020).

322 *See* Edith Ramirez, Comm'r, FTC, Remarks at the Privacy by Design Conference: Privacy by Design and the New Privacy Framework of the U.S. Federal Trade Commission (June 13, 2012), https://www.ftc.gov/sites/default/files/documents/public_statements/privacy-design-and-new-privacy-framework-u.s.federal-trade-commission/120613privacydesign.pdf [https://perma.cc/5ESV-8QMX].

323 *See id.*

324 *See id.*

325 *Privacy by Design,* EUR. UNION AGENCY FOR CYBERSECURITY, https://www.enisa.europa.eu/topics/data-protection/privacy-by-design [https://perma.cc/6HFB-5CX5].

326 Joel R. Reidenberg, *Lex Informatica: The Formulation of Information Policy Rules Through Technology*, 76 TEX. L. REV. 553 (1998), is foundational scholarship that observes that for digital information and network environments, "law and government regulation are not the only source of rule-making." *Id.* at 554. In addition, "[t]echnological capabilities and system design choices" and standards "impose rules on participants." *Id.* The "Article argues . . . that the set of rules for information flows imposed by technology and communication networks" must be understood, consciously recognized, and encouraged by policymakers. *Id.* at 555; *see also* LAWRENCE LESSIG, CODE: VERSION 2.0 (2006).

products and services, to set clearer rules of the road for businesses, and to promote digital innovation.[327]

VI. ALTERNATIVE SOLUTIONS FOR CONTACT TRACING APPS

Contact tracing apps are not the only mechanism available for collecting and aggregating relevant surveillance information; data can also be aggregated from social media and search engine results to observe population-level trends.[328] Since aggregated data is not associated with a known individual, it has fewer privacy risks than individualized location data, though location data is still challenging to fully anonymize.[329] As discussed previously in Part IV, third-party companies are a rich source for such data, and government entities can already access location data in the absence of a warrant by purchasing it from these data brokers.[330] In lieu of deploying any custom contact

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327 More than a dozen legislative proposals were introduced in the 116th Congress to comprehensively regulate personal information. There are currently two leading proposals for comprehensive privacy legislation, which share considerable similarities. The Chair of the Senate Commerce Committee, Senator Wicker (R-MS), introduced the SAFE DATA Act on September 17, 2020. S. 4626, 116th Cong. (2020). Ranking Member Senator Cantwell (D-WA) introduced the Consumer Online Privacy Rights Act (COPRA) in November 2019. S. 2968, 116th Cong. (2019); *see also* Cameron F. Kerry et al., *Bridging the Gaps: A Path Forward to Federal Privacy Legislation*, BROOKINGS INST. (June 3, 2020), https://www.brookings.edu/research/bridging-the-gaps-a-path-forward-to-federal-privacy-legislation [https://perma.cc/LK9S-NDUB].

328 If many people in a certain location enter similar symptoms into a search engine, this may be an early warning of a potential outbreak hotspot. *See* Farzad Mostashari & Tom Frieden, *Technology Companies Can Help Fight Covid-19*, CNN (May 13, 2020, 4:37 PM), https://www.cnn.com/2020/05/13/health/coronavirus-tech-companies-fight/index.html [https://perma.cc/8DYQ-RZGY]. For instance, Google's Community Mobility Reports and Facebook's "Mobility Dashboard "provid[e] de-identified, aggregate data on how communities . . . respond[] to shelter-at-home orders and physical distancing." *Id.* Facebook also opened a symptom survey for its users, which may be used by epidemiologists to forecast where COVID-19 may hit next. *Id.*

329 *Enlisting Big Data in the Fight Against Coronavirus: Hearing Before the S. Comm. on Com., Sci., & Transp.*, 116th Cong. 2, 8−9 (2020) (testimony and statement of Stacey Gray, Senior Counsel, Future of Privacy Forum); *see also Enlisting Big Data in the Fight Against Coronavirus: Hearing Before the S. Comm. on Com., Sci., & Transp.*, 116th Cong. 11 (2020) (Stacey Gray, Senior Counsel, Future of Privacy Forum, Answers to Questions Submitted by Members of the S. Comm. on Com., Sci., and Transp.).

330 *See* discussion *supra* Part IV; PANDURANGA ET AL., *supra* note 16; *see also* Joseph Cox, *Secret Service Bought Phone Location Data from Apps, Contract Confirms*, VICE (Aug. 17, 2020, 9:00 AM), https://www.vice.com/en_us/article/jgxk3g/secret-service-phone-location-data-babel-street [https://perma.cc/CUF8-EH59]; Joseph Cox, *Customs and Border Protection Paid $476,000 to a Location Data Firm in New Deal*, VICE (Aug. 25, 2020, 9:00 AM), https://www.vice.com/en_us/article/k7qyv3/customs-border-protection-venntel-location-data-dhs [https://perma.cc/992J-ML4M].

tracing solutions, private actors may already have tools available to them that could assist in the contact tracing process.

Digital advertising firms have long considered real-time location data as one of the many identifiers used to deliver relevant advertisements, along with associated device specific IDs (*e.g.*, Google Advertising ID (GAID)/Android Advertising ID (AAID) and Apple's Advertising Identifier (IDFA)).[331] However, only a fraction of advertising requests transacted between mobile devices and ad delivery platforms are accurate within fifty to one hundred meters of a specific location.[332] This is primarily due to the fact that location data, sent as part of advertising queries, does not often utilize the precise location information built into mobile operating systems.[333] Thus, an ad-tech based solution for contact tracing needs to be improved in both precision and accuracy to be effective, potentially by using operating system level tools like GPS location, cell site location data, and proximity to WiFi networks.

In general, these practices are facing increased scrutiny from bipartisan lawmakers, who are calling on the FTC to investigate the online advertiser economy.[334] In August 2020, a group of lawmakers sent a letter to Mobilewalla after it emerged that the company had potentially used location data collected from cellphones to identify specific characteristics of American protesters at Black Lives Matter demonstrations.[335] The company is part of an "ecosystem of data brokers that purchase or collect data from web browsers and apps

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331 Santiago Petrone, *Accessing the Advertising ID on Google and iOS Devices*, MEDIUM, (Feb. 26, 2019), https://medium.com/applike/accessing-the-advertising-id-on-google-and-ios-devices-ccd9097a3222 [https://perma.cc/Q4FA-QYH3].

332 Robert Williams, *Study: Most Location-Based Ad Spending Is Wasted on Bad Targeting*, MARKETING DIVE (Aug. 29, 2019), https://www.mobilemarketer.com/news/study-most-location-based-ad-spending-is-wasted-on-bad-targeting/561908 [https://perma.cc/6U9D-GTVK].

333 *Id.*

334 Letter from Sen. Ron Wyden, Sen. Bill Cassidy, Sen. Maria Cantwell, Sen. Sherrod Brown, Sen. Elizabeth Warren, Sen. Edward J. Markey, Cong. Member Anna G. Eshoo, Cong. Member Zoe Lofgren, Cong. Member Yvette D. Clarke & Cong. Member Ro Khanna to Joseph J. Simons, FTC Chairman (July 31, 2020), https://www.wyden.senate.gov/imo/media/doc/073120%20Wyden%20Cassidy%20Led%20FTC%20Investigation%20letter.pdf [https://perma.cc/4WG3-KAMC].

335 Letter from Sen. Elizabeth Warren, Carolyn B. Maloney, Chairwoman, House Comm. on Oversight & Reform, Sen. Ron Wyden & Cong. Member Mark DeSaulnier to Anindya Datta, CEO & Chairman, Mobilewalla (Aug. 3, 2020), https://www.warren.senate.gov/imo/media/doc/2020.08.03%20Letter%20to%20data%20broker%20Mobilewalla.pdf [https://perma.cc/C4BR-4CDJ].

installed on Americans' mobile devices."[336] After having conducted an investigation into the data-sharing ecosystem, Senator Wyden has stated that he plans to introduce a bill titled "The Fourth Amendment is Not for Sale Act," which would prevent law enforcement from buying personal information from data brokers to circumvent the usual warrant process.[337]

Nevertheless, privacy protections remain a major aspect in creating a contact tracing and exposure notification system that is not only safe, but is also trusted to be safe.[338] An option to consider is the use of differential privacy, where an algorithm could potentially be used to read the data on an individual's phone and only broadcast relevant information on infection status and, perhaps, previous locations without broadcasting personal data and metadata.[339] Researchers at Harvard University have developed a differential privacy tool that could be implemented in contact tracing and exposure notification apps to help address privacy concerns while still retaining functionality.[340] Such apps developed in the United States should also consider compatibility with contact tracing digital surveillance programs in other countries. International travel accelerated the global spread of COVID-19, and it is to be expected that any future pandemics would follow similarly.[341]

When considering that ultimately a global framework will be necessary, alternate solutions to contact tracing exclusive of specific apps may be the better solution. As mentioned earlier in this Article,[342]

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336 *Id.* at 1.

337 Katie Canales, *Sen. Ron Wyden Is Introducing a Privacy Bill that Would Ban Government Agencies from Buying Personal Information from Data Brokers*, BUS. INSIDER (Aug. 4, 2020, 4:15 PM), https://www.businessinsider.com/ron-wyden-fourth-amendment-is-not-for-sale-privacy-2020-8 [https://perma.cc/CFB6-8BSQ].

338 ORG. FOR ECON. COOP. & DEV., ENSURING DATA PRIVACY AS WE BATTLE COVID-19, (2020), http://www.oecd.org/coronavirus/policy-responses/ensuring-data-privacy-as-we-battle-covid-19-36c2f31e [https://perma.cc/8NFJ-LM75].

339 Harvard Univ. Priv. Tools Project, *Differential Privacy*, HARV. UNIV., https://privacytools.seas.harvard.edu/differential-privacy [https://perma.cc/W9LA-XDQ7].

340 *Id*.

341 Divya Ramjee & Maimuna Majumder, *Position Statement*, *in* NCVHS SUBCOMMITTEE ON PRIVACY, CONFIDENTIALITY AND SECURITY: COMMENTS RECEIVED IN RESPONSE TO REQUEST FOR COMMENT 3–4 (Sept. 10, 2020), https://ncvhs.hhs.gov/wp-content/uploads/2020/09/Public%20Comments-NCVHS%20Privacy,%20Confidentiality%20&%20Security%20Meeting-September%2014,%202020.pdf [https://perma.cc/HEU4-3RA6].

342 *See supra* notes 119–120 and accompanying text.

some countries are experimenting with wearable proximity tracking devices that would provide a level of scalability for this consideration.[343] Facial recognition technology has been suggested as a possible alternative to utilizing Bluetooth or location tracking technologies for contact tracing.[344] This idea though has not gained traction, particularly considering the risks highlighted in Part III of this Article, and a New York bill was introduced which would ban the use of facial technology to track the spread of COVID-19.[345]

Some countries have implemented the use of location-based QR code check-ins to assist in exposure notification and contact tracing efforts.[346] However, New Zealand has faced hurdles implementing this strategy due to the fact that it requires individuals to proactively scan their devices to check in to premises.[347] Adoption hurdles have also arisen among businesses because this inefficient system can cause long queues of customers.[348] To address problems like this, the United Kingdom is rolling out a hybrid solution.[349] Their decentralized proximity detection app based on the GAEN API also contains a separate QR-code feature, as well as a symptom-tracking feature.[350] Such an app could be a feasible option for the United States, since it

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343 *See* Asher, *supra* note 119.

344 Jacob Ward & Chiara Sottile, *A Facial Recognition Company Wants to Help with Contact Tracing. A Senator Has Questions*, NBC NEWS, (Apr. 30, 2020, 9:29 PM), https://www.nbcnews.com/tech/security/facial-recognition-company-wants-help-contact-tracing-senator-has-questions-n1197291 [https://perma.cc/3D32-KCQP].

345 S. S8311, 2019–2020 Legis. Sess. (N.Y. 2020) (introduced by State Senator Kevin Thomas on May 11, 2020). This bill "[r]elates to banning the use of facial recognition technology in the tracking of the coronavirus (COVID-19)." *Id.*

346 *Coronavirus: England and Wales' Contact-Tracing App Gets Launch Date*, BBC NEWS (Sept. 11, 2020), https://www.bbc.com/news/technology-54118022 [https://perma.cc/YW9Z-XN6X]; *see also NZ COVID Tracer App*, MINISTRY OF HEALTH (Dec. 21, 2020), https://www.health.govt.nz/our-work/diseases-and-conditions/covid-19-novel-coronavirus/covid-19-resources-and-tools/nz-covid-tracer-app [https://perma.cc/86R3-YKNX]; *QR Codes for Contact Tracing: How to Fight the Spread of Corona*, SCANOVA BLOG, https://scanova.io/blog/qr-codes-for-contact-tracing [https://perma.cc/NX7W-LGVZ].

347 Bronwyn Howell, *A Tale of Two Contact-Tracing Apps: Lessons from Australia and New Zealand*, AM. ENTER. INST. (May 22, 2020), https://www.aei.org/technology-and-innovation/a-tale-of-two-contact-tracing-apps-lessons-from-australia-and-new-zealand [https://perma.cc/K48N-BPHR].

348 *Id.*

349 Leo Kelion, *Coronavirus: England's Contact Tracing App Trial Gets Under Way*, BBC NEWS (Aug. 13, 2020), https://www.bbc.com/news/technology-53765240 [https://perma.cc/TMQ2-BLAJ].

350 *Id.*

would be easy to facilitate across all states, and would already have international implementation. However, limitations remain with a user still needing an app-supported mobile device to participate.

Another potential tracking option that has not been as widely discussed is the use of near field communication (NFC). Similar to Bluetooth technology, NFC allows for the remote transfer of information between devices.[351] NFC is unique in that devices can require a physical engagement with a "tag" to transfer data.[352] This gives consumers more control over when their information is broadcasted, in comparison to Bluetooth's continuous broadcasting.[353] Further, NFC inherently provides reassurance that physical proximity actually occurred.[354] However, as mentioned in Part II of this Article, user adoption and engagement are major hurdles to overcome, and NFC-based apps require that users actively want to use the app compared to passive transmission with Bluetooth and GPS.[355] Nevertheless, in considering between GPS, Bluetooth, or NFC, both the FTC and FCC should be involved from a regulatory standpoint.[356]

CONCLUSION

Ultimately, the United States needs to supplement traditional public health response efforts with the powerful utility of digital contact tracing tools, especially as we continue to develop strategies to reopen the country. With digital exposure notification and contact tracing relying completely on the identification of positive SARS-CoV-2 diagnoses, we must increase the availability and use of high-sensitivity, fast testing across the country. Additionally, although the United States' public is divided on using cellphones for exposure notification and contact tracing, the majority express disapproval over

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351 Simon Hill, *What Is NFC? Here's Everything You Need to Know*, DIGIT. TRENDS (Dec. 2, 2020), https://www.digitaltrends.com/mobile/what-is-nfc [https://perma.cc/5CFH-F7DD].

352 *Id.*

353 *Id.*

354 *Id.*

355 *Id.*

356 *Cf.* FTC STAFF, PAPER, PLASTIC… OR MOBILE?: AN FTC WORKSHOP ON MOBILE PAYMENTS (2013), https://www.ftc.gov/sites/default/files/documents/reports/paper-plastic-or-mobile-ftc-workshop-mobile-payments/p0124908_mobile_payments_workshop_report_02-28-13.pdf [https://perma.cc/2JVJ-TP6K].

using mobile device data to track an individual's movements for compliance with public health measures.[357] What may help shift public trust in, and facilitate use of, these tools is specific regulation in this area, buy-in from respected community leaders, and consistent messaging about the importance of doing what is best for ourselves and our society as a whole. In order to promote ideals of social good and unity, we must ensure that these tools are to be used only for public health initiatives. It is critical to understand that "[t]he power to do good things increases as we share information, but we need frameworks."[358] COVID-19 is merely a moment in a continuing spectrum of possible pandemics, and creating an effective contact tracing network at the national level now will not only help contain COVID-19 in the present, but also better prepare the United States to address future emerging infectious diseases.

357 Auxier, *supra* note 143.

358 O'Neill, *supra* note 112.